

Digitized by the Internet Archive
in 2011 with funding from
University of Illinois Urbana-Champaign

<http://www.archive.org/details/illinoisvegetabl515univ>

NOTICE: Return or renew all Library Materials! The *Minimum Fee* for each Lost Book is \$50.00.

The person charging this material is responsible for its return to the library from which it was withdrawn on or before the **Latest Date** stamped below.

Theft, mutilation, and underlining of books are reasons for disciplinary action and may result in dismissal from the University.
To renew call Telephone Center, 333-8400

UNIVERSITY OF ILLINOIS LIBRARY AT URBANA-CHAMPAIGN

L161—O-1096

JUN 06 2000

AGRICULTURE LIBRARY



COOPERATIVE EXTENSION SERVICE

COLLEGE OF AGRICULTURE
UNIVERSITY OF ILLINOIS
AT URBANA—CHAMPAIGN

AGX

616-438

March 1985

MAR 25 1985

NEWSLETTER SUPPORTERS

The 1985 issue of the *Illinois Vegetable Farmer's Letter* is currently being supported by the following companies:

J.R. Kelly Co.
Paarlberg Chemicals
Cole Chemical Co.
FMC - Agriculture Chemicals Group
Harris Moran Seed Co.
Potash Producers, Inc.

We greatly appreciate the support from these companies. In the past, however, we have had almost 30 sponsors. If we do not receive additional assistance, the newsletter will have to be discontinued.

Please give us your support so that we may continue to be a primary source of information on commercial vegetable production. Other companies and organizations that would like to help sponsor the *Illinois Vegetable Farmer's Letter*, should contact John M. Gerber (217)333-1969.

U OF I ACTIVITIES ON COMMERCIAL VEGETABLE PRODUCTION - 1984

This issue of the newsletter highlights some of the activities of the vegetable research and Extension staff during 1984. The University of Illinois has one of the best programs on commercial vegetable crops in the nation. We hope you are proud of your university.

Extension specialists are available to help answer your questions on commercial vegetables. Please feel free to contact any of the following individuals:

Vegetable Culture

C. Chris Doll
132 N. Kansas
Box 645
Edwardsville, IL 62025
618-656-9227

William Shoemaker
535 Randall Road
St. Charles, IL 60174
312-584-6166

Randy Lindstrom
K.C.C. Campus-River Road
P.O. Box 2266
Kankakee, IL 60901
815-939-3626

Vegetable Insects

Roscoe Randell
165 Natural Resources Bldg.
607 E. Peabody Dr.
Champaign, IL 61820
217-333-6650

Philip Nixon
1010 Jorie Blvd.
Suite 300
Oak Brook, IL 60521

Vegetable Diseases

Barry J. Jacobsen
N-533b Turner Hall
1102 S. Goodwin
Urbana, IL 61801
217-333-1845

AGRICULTURE LIBRARY

DEC 19 1989

UNIVERSITY OF ILLINOIS

John M. Gerber
208 Vegetable Crops Bldg.
1103 West Dorner Drive
Urbana, IL 61801
217-333-1969

Vegetable Marketing
J.W. (Bill) Courter
Dixon Springs Agricultural Center
Simpson, IL 62985
618-695-2441

Vegetable Weed Control
Herbert J. Hopen
206c Vegetable Crops Bldg.
1103 West Dorner Drive
Urbana, IL 61801
217-333-1967

Home Vegetable Gardening
James C. Schmidt
1107 West Dorner Drive
Urbana, IL 61801
217-333-2125

REPORTS FROM RESEARCH AND EXTENSION AT THE U OF I

BARRY EISENBERG, postharvest handling specialist in the Department of Horticulture:

Research in postharvest handling and storage of vegetable crops involved three crop areas: lettuce, sweet corn and horseradish. Lettuce research was designed to evaluate present packing procedures for hydroponically grown lettuce. Cooling rates, packaging techniques, and stacking patterns were examined. Sweet corn research involved an examination of how precooling and wholesale and retail handling affected sugar loss. Two varieties of sweet corn ('Florida Staysweet' and 'Gold Cup') were evaluated under different temperature regimes to emphasize why proper handling procedures are necessary at every step in the handling chain. Horseradish research examined how handling procedures at harvest and in storage affected disease development, loss of fresh weight, sprouting, and total sugar content.

CHRIS DOLL, area advisor in fruits and vegetables:

The 1985 Vegetable School at Collinsville attracted an audience of 100, including 9 Missouri growers. The primary emphasis in 1984 was growing under plastic. This school was followed by the annual horseradish day at which the University of Illinois gave research updates.

The summer twilight meeting at the Barry McMillan farm emphasized sweet corn and horseradish production systems and was concluded with attendance at a St. Louis Cardinal baseball game.

Cooperation from the staff of the University of Illinois Departments of Horticulture, Plant Pathology, and Entomology with field plots resulted in (1) good earworm control in sweet corn with Pounce at 4 and 8 ounces and at 48 to 96 hour intervals; (2) continued favorable potentials for horseradish herbicides; (3) showing the potentials of fumigation with methyl bromide-chloropicrin in horseradish production. There was a continuation of research in horseradish cultivars and storage, and pest management programs in horseradish and sweet corn.

Interest in direct marketing continues in the area, and is supported by the staff through farm visits, newsletters, and promotion of the Farm Market Program.

WALTER SPLITTSTOESSER, vegetable physiologist:

The tomato is usually self-fertilized with wind being the primary pollination stimulus. Failure to set fruit is an important limiting factor affecting yield of plants. Although tomatoes can be grown over a wide range of temperatures, most cultivars only set adequate fruit under the narrow range of night temperatures of 59-70°F.

Parthenocarpic tomatoes set fruit naturally without seed. Research in the Department of Horticulture has shown that parthenocarpy in 'Severianin' tomato is controlled by the environment, and the control is a single recessive gene. Under favorable environments, seeded fruit is produced, but under unfavorable environments, such as the hot summers in Illinois, seedless fruit is produced. Fruit production in the greenhouse can also be a problem due to insufficient pollen shed. Again, under these conditions, seedless fruit is produced.

It is hoped that this parthenocarpic gene can be transferred into lines with other desired horticultural characteristics. This could result in increased production, both in the greenhouse in winter, and under the hot Illinois summers.

BILL SHOEMAKER, horticulturist:

It was a busy year in 1984 at the Illinois River Valley Sand Field in Kilbourne, IL. Bill conducted vegetable trials, several studies, and hosted two twilight meetings for the growers of the region. Trials were conducted extensively on melons, including honeydew melons, large watermelons, yellow-fleshed watermelons, and observations on mixed melons. A trial was also conducted on processing tomato cultivars. Two studies he conducted looked at the use of spunbonded polyester materials as row covers in a "floating" application. Use of the row cover over black plastic mulch on several planting dates was compared to the use of black plastic mulch or bareground planting of direct-seeded seedless watermelon. He also evaluated its effectiveness on transplanted muskmelons in black plastic mulch. An evaluation was also conducted on the use of black plastic mulch on watermelons and muskmelons, both direct-seeded and transplanted. Results of this work can be found in the *1984 Illinois Vegetable Research Report*.

Bill is now established at the Northern Illinois Horticultural Research Center in St. Charles. He will be expanding his cultivar evaluation work with trials being carried out on ten to twelve vegetable crops. Other work he will conduct will include several studies on the use of row covers or tunnels on vegetable crops, an N fertility study on fresh market tomatoes and possibly some drip irrigation work. Any interested party is welcome to contact Bill at the Kane County Cooperative Extension Service Office (312)584-6166.

RANDY LINDSTROM, horticulturist, and *ROBERT CURRY*, Extension advisor from Kankakee County:

The University of Illinois Horticulture Department conducted a successful twilight meeting in August of 1984. Forty-five growers viewed research plots dealing with variety trials on watermelons, broccoli, cauliflower, and peppers. Other studies conducted included a muskmelon transplant container comparison, a herbicide study on cucumbers, and fertility studies on peppers and broccoli.

The Redwood Inn was the site for the Kankakee area Vegetable Growers School on January 22, 1985. Sixty-five growers heard various updates on insects, diseases, and weed control. Variety trial results from the Kankakee River Valley Sand Field and the Illinois River Valley Sand Field were presented. Special talks were given on drip irrigation and the development of good advertising programs.

Following the meeting at the Redwood Inn, a representative from the University of Illinois Experiment Station announced the news that a permanent field will be established in the Kankakee River Valley. Land acquisitions will be looked into in the near future.

BARRY JACOBSEN, Extension pathologist:

He presented disease control information at 7 schools in Illinois and made 37 farm visits. Barry made his annual trip to Tifton, Georgia, to inspect transplants for Illinois growers. He published a number of disease reports and circulars and co-authored colored picture sheets on vegetable diseases. These are available for 10¢ each from Vo-Ag Services. The sheets cover 64 diseases of tomatoes, peppers, eggplant, beans, lettuce, onions, and crucifers.

Dr. Jacobsen continued his research activities on snapbeans, peas, and horseradish. From August to December, he worked on biological control of *Rhizoctonia solani* and the potato cyst nematode while on sabbatical leave in Germany. Both the growers and his university colleagues are pleased to have Barry back.

ROBERT SCHMERBAUCH, Lake County Extension advisor:

A twilight meeting was held at the Tony Titus farm in Libertyville on June 20. Forty-six participants viewed the results of trials with spunbonded row tunnels and plastic mulch. Mr. Schmerbauch attended the National Agricultural Plastics Association Meeting in North Carolina.

CARL CANTALUPPI, Rock Island Extension advisor:

On December 18, 1984, the Iowa-Illinois Processing Tomato Meeting was held at the Holiday Inn, Moline, Illinois. Speakers from the University of Illinois, Iowa State University, and Heinz USA spoke on topics related to cultural practices, as well as insect, disease, and weed control updates. Attendance was 114, the best that we've had at this meeting. Looks like we can look forward to this meeting for years to come.

On January 23, 1985, the Bi-State Horticulture Clinic was held at the Moline Holiday Inn. State specialists from the University of Illinois and Iowa State University spoke on different aspects of fruits, vegetables, and ornamentals to a crowd of over 175 people. About 40 people attended Carl Cantaluppi's talk on the direct marketing of fruits and vegetables.

BRUCE SPANGENBERG, McHenry County Extension advisor:

Eighty-seven commercial vegetable growers and industry representatives attended the 1985 Northeastern Illinois Vegetable Growers School held in Woodstock on January 3. The majority were from McHenry, Lake, Kane, and northern Cook counties in Illinois, and Walworth and Kenosha counties in Wisconsin. Topics covered at the meeting included: pesticide safety equipment, a panel discussion on vegetable varieties, management of cucurbit and sweet corn diseases, and recommendations for insect and weed control in 1985. An update on the Northern Illinois Horticulture Research Center was also presented. Based on evaluation from results, growers were very pleased with the meeting and planned on using much of the information to help themselves in the future. The McHenry County Commercial Vegetable Growers Committee will also be using the evaluation results in planning next year's program.

JOHN M. GERBER, vegetable specialist:

A series of studies were conducted on row tunnel materials for early production of melons, tomatoes, green beans, and carrots. Spunbonded materials were particularly effective in improving germination and early growth of direct-seeded crops. Spunbonded and vented polyethylene tunnels increased yields of melons but delayed fruit set of tomatoes. Several experiments were conducted on seeding rates and plant

populations of high sugar sweet corn genotypes. If a uniformly spaced stand can be achieved, 'Florida Staysweet' can be planted at similar rates as normal, sugary sweet corn. Almost 100 varieties and breeding lines of high sugar corn were evaluated for emergence in cold field soils. 'Florida Staysweet' continues to be the most consistent high sugar variety. Several promising breeding lines were identified for cold soil vigor, yield, and ear quality.

HERB HOPEN, acting head of the Department of Horticulture, reports on weed control research:

Cabbage and Broccoli - Studies were conducted at St. Charles to evaluate ppi, pre-emergence and postemergence candidate herbicides for addition to our meager choice of brassica herbicides. Several promising future herbicides were identified.

Snap beans - A study at Kilbourne indicated best control was obtained with Treflan, and Treflan plus Eptam as outlined in our current recommendations.

Melons and Cucumbers - Studies confirmed that Prefar plus Alanap is our best registered treatment. The early postemergence grass herbicides (Poast and Fusilade) show promise for future use.

Turnips - As part of our efforts to expand the labels for Poast and Fusilade, turnips showed a good tolerance to both herbicides. This study was part of an IR-4 effort to obtain registration of these herbicides for the root crop groups of vegetables.

JOHN SWIADER, fertility specialist:

In 1984, fertility studies involving sweet corn, pumpkins, tomatoes, and broccoli were conducted at various locations throughout the state as well as at the Urbana South Farm. For the third consecutive year, growth response in early sweet corn to banded phosphorus (P) formulations was evaluated at the Dixon Springs Agricultural Center. A 30% phosphoric acid solution applied in a 3-inch wide band over the row at 60 lbs P/A proved an effective P source for early sweet corn plantings. Research was initiated at the Illinois River Valley Sand Field to determine irrigation scheduling and cutoff dates for processing pumpkins on sandy soils. Pumpkin response to nitrogen regime and nitrapyrin under dry land and irrigated culture was studied at the Urbana South Farm. In addition, work was continued in 1984 on several studies involving nitrogen and potassium requirements and population effects for direct-seeded and transplanted tomatoes. During late summer and early fall, nitrogen requirements for late broccoli were evaluated at the Kankakee River Valley Sand Field.

SWEET CORN PRODUCTION UP IN 1984

The Illinois Department of Agriculture stated that production of sweet corn for fresh market in Illinois totaled 331,000 hundredweight in 1984, up 5 percent from 1983, and up 9 percent from 1982.

Acreage harvested totaled 3,800 acres, up 3 percent from 1983, and the same as in 1982. The yield was 87 hundredweight per acre, up to hundredweight from 1983.

Total value of the crop declined 11 percent to \$3,118,000 as the price dropped to \$9.42 per hundredweight from 1983's \$11.10.

Meanwhile, production of sweet corn for processing in the state totaled 194,180 tons in 1984, up 34 percent from 1983 and up 4 percent from 1982.

Harvested acreage, at 36,500 acres, increased 6 percent from 1983, while 1984's yield of 5.23 tons per acre increased from 4.19 tons per acre in 1983.

Total value of the 1984 crop was \$13,573,000, up 42 percent from 1983 as the average value per ton increased 5 percent to \$69.90 per ton.

DR. HOPEN LEAVES ILLINOIS

After many years of service and dedication to the vegetable industry in Illinois, Dr. Herb Hopen has accepted the position as head of the Department of Horticulture, at the University of Wisconsin. Dr. Hopen will be returning to his home state, but promises to remain close to the many friends he has in Illinois. Colleagues in the Department of Horticulture will miss Herb and Joanne, but wish them well.

In a letter to the Illinois Vegetable Growers Association, Herb concludes: "I wish you (my many friends in the Illinois vegetable industry) the best, and please remember I will not be that far away to the north."

We are pleased that we have a good friend and neighbor on our northern border.

Good luck, Herb!

CONGRATULATIONS TINO

Dr. Constantin (Tino) Rebeiz, a faculty member in the Department of Horticulture, was awarded the prestigious Paul A. Funk Award by the University of Illinois College of Agriculture and the Funk Family.

Rebeiz is internationally known for his pioneering work in the biosynthesis of chlorophyll. His research in this area has led to the development of laser herbicides, which have received worldwide attention.

Duplicating the greening process in a test tube has been one of Professor Rebeiz's major achievements: he has developed cell-free systems capable of synthesizing chlorophylls *a* and *b*. To study the process further, he has developed new spectroscopic and analytical techniques and equations. These in turn have demonstrated unambiguously the existence of several new chlorophylls and of several biochemical pathways of greening in higher plants. Previously, these steps had only been postulated on the basis of genetic evidence.

His research has far-reaching implications because chlorophyll acts as a catalyst in the conversion of solar energy into chemical energy and food. The bioengineering of photosynthetic membranes (which are much more potent than natural plant membranes) has immediate as well as long-term benefits. The design of laser-biodegradable herbicides is already a reality. Professor Rebeiz is applying his knowledge of the greening process toward improving plant productivity. This effort, as well as his concept of a cell-free agriculture, could revolutionize world food production.

Rebeiz, whose work has had a profound impact on plant physiology, is recognized both nationally and internationally as an eminent scientist. He is also considered an excellent teacher, and his students have benefited from his research and his guidance. Rebeiz has no fewer than eighteen major discoveries to his credit. His contributions in spectrofluorometry have found practical applications in state and national industries. His name appears in *Who's Who in America* and *Who's Who in the World*.

RESEARCH FARMS

The Department of Horticulture currently operates 4 facilities for vegetable research. These facilities will have field days during the summer, which will be announced in the next newsletter. Growers are welcome to stop by to see the plots.

Northern Illinois Horticultural Research Center

Peck Rd. and Rt. 138

St. Charles, IL

312-584-7254

contact: Bill Shoemaker or Miguel Sanchez

Mailing Address: Kane County Extension Office

535 Randall Road

St. Charles, IL 60174

Kankakee River Valley Vegetable Research Field

Wichert, IL

815-939-3626

contact: Randy Lindstrom or Bob Curry

Mailing Address: Kankakee County Extension Office

K.C.C. Campus-River Road

P.O. Box 2266

Kankakee, IL 60901

Vegetable Research Farm

Urbana South Farms

Urbana, IL

217-333-1969

contact: John Gerber or Jack Juvik

Mailing Address: 1103 West Dorner Drive

Urbana, IL 61801

Dixon Springs Agricultural Center

Rt. 145

Simpson, IL

618-695-2441

contact: Bill Courter

Mailing Address: Dixon Springs Agric. Center

Simpson, IL 62985

WINTER SCHOOLS

The University of Illinois sponsors several winter schools for commercial vegetable producers. The dates and locations will be announced in future newsletters. For more information, you may contact the following people:

1. ILLINOIS FRUIT AND VEGETABLE GROWERS CONVENTION AND TRADE SHOW, Springfield, IL, January 14-16, 1986.
Contact: John M. Gerber; 217-333-1969.
2. ILLINOIS FOOD PROCESSORS SCHOOL, Champaign, IL.
Contact: Herb Hopen; 217-333-1967.
3. NORTHERN ILLINOIS VEGETABLE SCHOOL, Woodstock, IL.
Contact: Bruce Spangenberg; 815-338-3737.
4. ILLINOIS-INDIANA VEGETABLE SCHOOL, Lake Co., IN.
Contact: Greg Stack; 312-532-4369.

5. ILLINOIS-IOWA PROCESSING TOMATO SCHOOL, Moline, IL.
Contact: Carl Cantaluppi; 309-796-0512.
6. NORTHERN ILLINOIS VEGETABLE SCHOOL, Rockford, IL.
Contact: Laura Wyatt; 815-987-7379.
7. KANKAKEE RIVER VALLEY VEGETABLE SCHOOL, Kankakee, IL.
Contact: Bob Curry; 815-939-3626.
8. SOUTHWESTERN ILLINOIS VEGETABLE SCHOOL, Collinsville, IL.
Contact: Chris Doll; 618-656-9227.
9. SOUTHERN ILLINOIS VEGETABLE SCHOOL, Cobden, IL.
Contact: Kevin Kirby; 618-833-5341.

PUBLICATIONS

A number of publications are available free of charge from the University of Illinois. You may receive a list of all publications by requesting Hort Series Factsheet VC-12, *Publications About Vegetable Crop Production*, from the Department of Horticulture.

In addition, a number of circulars are available which describe weed, insect, and disease control, as well as fertilizer and variety recommendations. The following circulars are available free from the Office of Agricultural Publications, 47 Mumford Hall, 1301 W. Gregory Drive, Urbana, IL 61801.

- C-884 Growing vegetable transplants (revised 1984).
- C-897 Insect pest management guide - 1985.
- C-907 Weed management guide - 1985.
- C-1174 Vegetable varieties for commercial growers.
- C-1184 Disease management guide - 1985.
- C-1185 Fertilizer guide for commercial vegetable growers.

In addition, the Department of Horticulture publishes several manuals and reports that will be available for commercial producers. These are available from the Department of Horticulture, 124 Mumford Hall, 1301 W. Gregory Drive, Urbana, IL 61801. Make checks payable to the University of Illinois.

RESEARCH REPORTS

1983 Illinois Vegetable Research Report, 112 pages. This report provides summaries of variety trials, fertility studies, weed research, hydroponic production studies, plastic mulch and row cover experiments, and more. \$5.00.

1984 Illinois Vegetable Research Report, 167 pages. This report provides summaries of disease research on sweet corn, fungicide trials on onions, cultural research on horseradish, fertilizer studies on tomatoes, hydroponic greenhouse production, row cover research, variety trials, and more. \$5.00.

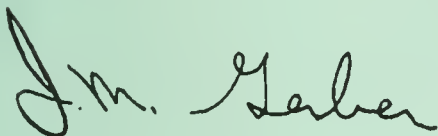
PROCEEDINGS

The *Proceedings of the Illinois Vegetable Growers School* summarizes the presentations at 7 regional vegetable schools. It also includes papers on the marketing sessions and vegetable production sessions held at the annual fruit and vegetable growers convention. Individuals attending the convention will receive a copy as part of the registration fee. Others may purchase a copy for \$5.00.

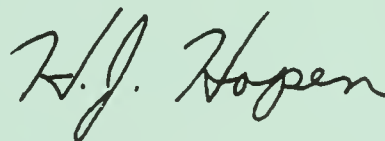
The 1985 Proceedings is now sold out. However, the 1986 Proceedings will be available for sale in April. To receive a copy, write to the Department of Horticulture and request the *Proceedings of the 1986 Illinois Vegetable Growers School*. Make checks payable to the University of Illinois.

VEGETABLE HANDBOOK

The Vegetable Production Handbook is currently being revised. Copies of the current one are available for \$5.00 each from the Department of Horticulture. The new edition will be available in late summer, 1986. This handbook is a basic "how to" approach to growing vegetables in the Midwest. It is aimed at roadside marketers and pick-your-own growers, especially those just getting started in the business.



J.M. Gerber
Vegetable Crops Extension Specialist



H.J. Hopen
Vegetable Crops Extension Specialist



J.W. Courter
Vegetable Crops Extension Specialist

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 West Gregory Drive
Urbana, Illinois 61801

Official Business
Penalty for private use, \$300

R.G. CRAGLE
211 MUMFORD HALL

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE
AGR 101



VUA

FIRST CLASS

34.105
EL
op. 2



Illinois Vegetable Farmer's Letter

COOPERATIVE EXTENSION SERVICE

COLLEGE OF AGRICULTURE
UNIVERSITY OF ILLINOIS
AT URBANA—CHAMPAIGN

AGRICULTURE LIBRARY

SEP 21 1988

UNIVERSITY OF ILLINOIS

Vol. 9, No. 2

July 1989

Three more busy months have passed and here we are again. Some of you who thought you would never again see too much rain after last summer have found out you were wrong. Others are still waiting. Overall, it's a welcome change from last year, although other problems are showing up with damper weather.

We hope that planting has gone well so far and that insects and diseases haven't been a cause for despair. Roscoe Randell tells me

that he's never seen corn earworm counts this high this early, so brace yourselves. Be on the lookout for various diseases associated with damp conditions, too. The plant pathologists didn't have too much to do early last summer as the dry conditions held back disease development. This year, they have already been busy.

All of you are still busy too, so try to stay alert, even if you're doing something for the fourteenth time this spring. It hurts just as much when you get injured late in the season. Be careful out there!

New Bill Would Aid Organic Agriculture

New federal legislation would give a big boost to low-input sustainable agriculture (LISA) and start the process of defining and certifying organically grown produce. The bill, the Farm Conservation and Water Protection Act of 1989, was introduced May 2 by Senator Wyche Fowler Jr., D-Georgia, Chairman of the Conservation and Forestry Subcommittee of the Senate Agriculture Committee. The bill would expand federal research, outreach, and education into LISA practices that reduce chemical pesticide use.

The bill would also require the establishment of a commission under the USDA to determine the feasibility of a national organic certification program. The bill spells out that "certified organic food" has been

harvested, preserved, processed, and stored without the use of synthetic chemical fertilizers, pesticides, irradiation, synthetic coloring agents, artificial sweeteners, synthetic chemical preservatives, or other similar additives.

Chuck Searcy, Sen. Fowler's aide, said the legislation provides incentives for growers to change their practices but does not impose produce penalties. A similar bill that Fowler introduced last year called for penalties for failure to comply with reforms. The bill would also remove all barriers and disincentives, such as not allowing those who use LISA to have crop insurance and loan guarantees from federal programs that prevent growers from taking advantage of improved agricultural methods. The barriers would be replaced by a series of incentives including credit, crop insurance, and low-input certification. The incentives would encourage a transition away from heavy use of pesticides, fertilizers, and other chemicals.

Senator George Mitchell, D-Maine, said that by helping to reduce pesticide use, this legislation would help protect the quality of drinking water in rural areas. The bill has received strong Senate support. On hand for the introduction were Mitchell and Senator Patrick Leahy, D-Vermont, chairman of the Senate Agriculture Committee. Bill cosponsors include Senator Albert Gore, D-Tennessee, chairman of the Environmental and Energy Study Conferences; and Senator Alan Cranston, D-California, Senate Majority Whip.

From an article by Larry Waterfield in The Packer, May 13, 1989.

Growers' Rights: Know How to Protect Them

A representative from a government agency appears at your farm and wants document X. Your wife, who handles the farm books, has gone shopping, and you have a load of produce to ship out. What should you do? Jim Houlihan, an attorney with Harris, Beach, Wilcox, Rubin, and Levey, gave the following advice at the New York State Vegetable Conference.

First, when a representative of a government agency appears on your farm without notice:

1. Be polite, firm, and businesslike.
2. If you do not know the person, ask to see his or her credentials. Ask the agent to wait while you check to make sure the person's credentials are legitimate.
3. Ask the purpose of the visit. Get all the information you can before you give any information to the agent.
4. Get specifics. Is the agent visiting in response to a complaint? If so, ask for a copy of the complaint. You should be provided with a copy of the complaint with the complainee's name blanked out.
5. Then ask, "Which records do you want to see? On which employee? For what year? Whom do they want to interview?" Try to limit the request. Give the agent specifically what is requested and no more. When you understand specifically what the agent wants to see, try to negotiate a meeting that will not interfere with your production schedule.
6. Try to be responsive, but shift the focus from your place of business to somewhere else.
7. Do not say, "I don't know where the records are" or "I don't have those records." If a government agent hears one of these two phrases, he or she thinks that all of his or her quotas can be satisfied in one stop.
8. Keep records required for government regulations separate from your other business records. Don't allow a government agent to look through all your business records in an effort to find what he or she is looking for.
9. If the agent persists and you are ready to say, "No, I'm not going to give you anything," consult a lawyer. This response will buy you a little bit of time. The agent can still go to a judge and get an administrative subpoena, but you may be able to salvage something in the meantime. If you give the agent permission to examine your records, you may waive your rights. If you refuse to provide records, your lawyer may be able to challenge the way the records were obtained.
10. Remember, the agent has a job to do and you have a job to do--running your farm business. The American way is to protect the rights of the citizen. All you are doing in this process is making sure your rights are protected.

If the agent ends up looking at your records or interviewing your employees, accompany the agent at all times. Make notes on what he or she sees. Ask for a closing interview and ask what was seen.

If your employee was interviewed, you may ask, "What did the agent ask for? What information did you give the agent?" You may not take punitive action against the employee for any information given, but you may ask for the information.

As farmers are asked to keep more and more records, the best way to beat the government at its game is to be knowledgeable about the laws that affect your farm business.

This summary of Jim Houlihan's presentation appeared in Today's Grower, May-June 1989.

Illinois Herb Association Is Organized

On May 21, the Extension office in Mount Vernon held an organizational meeting for an Illinois professional herb growers' and marketers' association. About 25 people from a wide variety of locations around the state were able to attend, and many others who responded with enthusiasm to the concept of a state organization were unable to attend the meeting.

Possible goals and programs of such an association were discussed, and a seven-member steering committee was chosen to draft bylaws. Members of the committee were in agreement about the purposes and objectives of the organization.

The steering committee met June 4 to review a proposed set of bylaws drafted by Marilyn Miller and Don Naylor. Changes were made and a second meeting scheduled for July to approve the amended bylaws. Nominations for the board of directors and officers of the organization will also be made at this meeting. A general meeting will then be called to hold an election and actually get this new association under way.

Anyone interested in joining or assuming a leadership role in this organization should contact me as soon as possible for further details. The response so far has been beyond my expectations, so join the fun.

Plan Your Sweet Corn Harvest

Many factors influence the harvest date of a corn planting. Time of planting, soil temperature, air temperature, and variety are significant influences.

The first time you can get a real handle on the harvest date is at silking. The first silks appear after the tassel. When 10 percent of the ears are showing silk, the corn will be approximately 20 days to harvest. Warm weather may advance or cool weather delay harvest, but rarely will this date fluctuate more than a single day from the magic number of 20.

You now know how to closely calculate the harvest date and plan your program. Get your signs ready and the starting date advertised.

Plan to harvest in the cool of the early morning. Get the corn hydrocooled, refrigerated, or iced as rapidly as possible. The heat of respiration can cause piles of corn to heat up in boxes, trucks, or wagons. This function is doubled for each 18°F; that is, it will heat twice as fast at 58°F as at 40°F, four times as fast at 76°F, and eight times as fast at 94°F. Rapid and dependable cooling is, therefore, necessary.

Corn should be harvested correctly, cooled, and sold rapidly if your product is to be number one in quality and invite repeat customers.

Contributed by J.S. Vandemark, Professor Emeritus, Horticulture.

Bees Are an Important Part of Vine Crop Production

Growers are finding that good honeybee management can increase yields by 25 to 50 percent and increase fruit quality in vine crops such as squash, cucumbers, melons, pumpkins, and gourds.

Pollination is essential for high yields and good fruit quality in vine crops. Although many crops can be pollinated by wind, insects, or wild bees, the flowering habits of vine crops require the aid of honeybees for complete pollination.

How many bees are needed?

In general, at least one colony of 30,000 to 50,000 bees per acre is needed for adequate pollination of vine crops. Cucumbers planted in high populations for mechanical harvest may require at least three colonies per acre.

Perhaps more important than the number of colonies, however, is the number of actual visits bees make to the blossoms. Only 12 visits per day to each female flower are necessary for muskmelon, but cucumbers require at least 15. Competition from other plants that bees prefer more, such as honeysuckle, clovers, and buckwheat, can be a detriment to pollination. Bees also seem to prefer other cucurbits to cucumbers.

Stress to plants and bees, particularly prolonged periods of extremely hot or cold weather, can also affect pollination. Whatever the weather, a flower is receptive to pollen for about one day. Conditions have to be perfect to allow bees to visit during that short time window.

Small fields--one or two acres--can be adequately pollinated when bees are placed along one side. Because bees are more effective if they aren't forced to forage

great distances, larger acreages should have colonies evenly distributed in or around the field. A good rule of thumb is that no point in the field should be more than 200 to 300 yards from a colony.

Bee colonies should be placed in the field two to three days after first blooms occur. If they are introduced too early, bees may become established on other blooming plants and neglect the target crop.

Position hives facing east--if possible, in a location that provides afternoon shade. If water is not available nearby, place containers of clean water near the hives. This is especially important during hot, dry weather. Place wire mesh or sticks in the containers to provide a place for bees to light.

Most insecticides are poisonous to bees. Protection is critical after blooming starts and bees are in the field. If insecticides are necessary, apply in late afternoon or evening when bees are less active. Always notify the beekeeper of insect control requirements, so bees can be moved if necessary.

The results a grower should expect from a good bee management program will vary with crops, individual fields, and weather. Complete pollination with the aid of bees should decrease numbers of misshapen fruit and, therefore, reduce cullage.

Cucumbers, watermelons, and muskmelons suffer the greatest yield reductions from inadequate bee activity, but all vine crops can be affected. Reported increases in total yields resulting from good bee management can range from 25 percent to 50 percent. Pickling cucumber growers have seen an average increase of 30 percent from effective use of bees.

From an article in Asgrow Review.

Tastier Tomatoes on the Horizon?

Biochemical clues from an obscure Brazilian tomato have led Cornell University plant scientists to a treatment that doubles the amount of time ripe tomatoes retain top eating and storage quality. The inexpensive process extends the shelf life of tomatoes from four to five days and from ten to twelve days. Cornell has applied for a patent on the method.

The method has worked successfully in laboratory-scale tests performed by David Law, a research associate on the project, but whether it will work under large-scale commercial conditions remains to be seen. A large company recently signed an agreement with Cornell to evaluate the technique.

The process uses naturally occurring chemicals called polyamines to slow the ripening process of the ripe fruit, a specialist explained. "We simply increase

the level of polyamines that are already in the fruit, thus preventing the ripe fruit from becoming soft too quickly," he said.

The scientists infuse the polyamine or methionine through a process known as vacuum infiltration. Air is forced out of the fruit while it is in an airtight container with the chemical solution. The chemical solution is then drawn into the fruit through the stem or stem scar when the vacuum is released.

The quantity of butanediamine or methionine needed to treat the fruit is very small, about 1 milligram per fruit; the same amount of these chemicals is naturally present in the fruit. Both chemicals can be easily synthesized at minimal cost.

The Cornell researchers got the idea of using polyamines to extend the keeping quality of tomatoes while studying an obscure Brazilian tomato called Alcobaca. This tomato has an unusual characteristic; its fruit can hold its keeping quality for several weeks. Alcobaca must be allowed to ripen fully on the vine because it refuses to ripen if picked green.

Cornell plant scientist Martha Mutschler, an associate professor of plant breeding, is trying to introduce this unique genetic trait into new tomato varieties.

From an article in The Packer, May 13, 1989.

Modified Atmosphere Packaging Extends Shelf Life

The future of modified atmosphere packaging looks good, according to Michigan State University horticulturist Art Cameron. After conducting experiments on sweet cherries, tomatoes, and sweet basil, Cameron reported extended shelf life in each case.

He briefed growers at the April 25 annual Controlled Atmosphere Clinic conducted by the University at its Clarksville Horticultural Experiment Station. Cameron said he believes the best candidates for modified atmosphere packaging are commodities that controlled atmosphere (CA) storages can improve, although CA storing cannot be economically justified. Fruits such as blueberries, raspberries, and cherries are good candidates, he said.

University postharvest specialist David Dilley said many soft fruits respond extremely well to high carbon dioxide levels. Fifteen to 20 percent carbon dioxide is used as a fungicidal process. A high carbon dioxide charge will arrest mold development, he said.

Cameron's own experiments in extending sweet cherry shelf life have been successful. He held Schmidt cherries at 68°F at various oxygen levels and, in the lower ranges, the fruit remained unripe, even though it was picked just before the ripeness stage. However, fermentation occurred below 1 percent.

With tomatoes, Cameron said, the key component is to control relative humidity because it can get high in a sealed bag. Such conditions promote mold growth, causing visual deterioration rather than potential danger. "Most of them are simple saprophytes eating the sugars leaching out of the tomatoes," he said.

In his experiments, Cameron sealed sorption compounds inside the packages to soak up excess water. The procedure worked, keeping humidity low for a long time. These compounds were nontoxic and relatively cheap, he said.

Cameron added that sweet basil, like tomatoes, is sensitive to chill and needs careful handling. He has been able to hold fresh sweet basil at room temperature for more than three weeks with the right combination of oxygen and carbon dioxide inside a film package.

Cameron sees promise for modified atmosphere packaging in the fresh herb industry. "Very little research has been done so far on the storage of fresh herbs," he said. "The whole fresh herb industry is just getting started."

From an article in The Packer, May 13, 1989.

Use Proper Storage for Fruits and Vegetables

Summer is here and another harvest is upon us. Having produced a saleable crop, you will want to protect that vegetable crop by proper storage techniques. Many specialty crop producers do not have field-cooling equipment. It should be no revelation to you that you should harvest early in the morning before the fruits and vegetables have accumulated field heat. Then, at the very least, keep the harvested crop in a shaded location. It is hard to improve the quality of a product after it is harvested, so do all that you can to keep as much of the quality until it is sold to the consumer.

Each crop has an optimum storing range for temperature and humidity. You should also remember that some crops are not very good to store for extended periods of time. Crops that do not store well for long periods should be considered when you are planning the amount of that crop that you will be planting and your ability to harvest and market it in as short a time as possible.

You should consider storing only your best-quality fruits and vegetables. Produce that is below grade or shows signs of overmaturity, bruising, or decay is not worth the storage space. The maturity or ripeness of the crop also affects its storage shelf-life. Some vegetables such as dry onions and winter squash will need to go through a warmer curing period prior to storing at the temperatures listed in Table 1.

Table 1. Storage Guidelines for Various Crops

Crop	Temperature, °F	Humidity, %	Storage life
Snap beans	45 to 50	90 to 95	7 to 10 days
Lima beans	37, shelled		7 days
	41 to 45, shelled		
Beets	32	90 to 95	1 to 3 months, topped 10 days, with tops
Blueberries	33 to 34	90 to 95	3 weeks
Broccoli	32	90 to 95	10 to 14 days
Brussels sprouts	32	90 to 95	4 weeks
Cabbage	32	90 to 95	
Cantaloupe	40	85 to 90	12 to 16 days
Carrots	32	90 to 95	
Cauliflower	32	85 to 90	2 to 3 weeks
Celery	32	90 to 95	
Sweet corn	34 to 38	85 to 90	3 days
Supersweet varieties			10 days
Cucumbers	45 to 50	90 to 95	12 to 14 days
Eggplant	45 to 50	85 to 90	3 days
Grapes	32	90	3 to 5 weeks
Collards	32	90 to 95	10 to 14 days
Kale	32	90 to 95	10 to 14 days
Swiss chard	32	90 to 95	10 to 14 days
Leeks	32	90 to 95	1 to 3 months
Melons, ripe	50	80 to 85	3 to 5 days
Okra	45	85 to 95	10 days
Dry onions	32	65 to 70	6 to 8 months
Green onions	32	90 to 95	3 days
Pears, ripe	32 to 45	90	2 to 3 days
Peas, snap	33 to 35	50	1 day
Peppers	45 to 50	85 to 90	8 to 10 days
Potatoes	38 to 40	90	1 to 3 months
Pumpkins	50 to 55	50 to 75	2 to 3 months
Radishes	32	90 to 95	10 to 14 days
Raspberries	32	90 to 95	1 to 2 days
Rutabagas	32	90 to 95	2 to 4 months
Spinach	32	90 to 95	10 to 14 days
Squash, summer	45 to 50	90 to 95	4 to 7 days
Squash, winter	50 to 55	50 to 75	1 to 6 months
Strawberries	32	90 to 95	5 to 7 days
Tomatoes	55 to 70	85 to 88	7 days
Watermelon	65 to 70	room	7 days

Additional information on specific crops can be found in the USDA publication *The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks*, Agriculture Handbook Number 66, which can be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. You will need to write for a current price and to check availability. Free copies are no longer distributed.

Two additional publications may be helpful: AG-FS-1424 *Harvesting and Storing Garden Vegetables*, available by writing to the Distribution Center, Minnesota Extension Service, 240 Coffey Hall, University of Minnesota, St. Paul, MN 55108; and *Storing Vegetables and Fruits in Basements, Cellars, Outbuildings and Pits*, a USDA publication, Home and Garden Bulletin Number 119, available from your county Extension office.

From an article in the August 1988 Minnesota Fruit and Vegetable Growers' Association publication.

Goal Approved for Use on Horseradish

The U.S. Environmental Protection Agency (USEPA) has granted a Section 18 emergency exemption for the use of Goal on horseradish. This emergency exemption is only for the 1989 planting season. Rohm and Haas, the manufacturer of Goal, in conjunction with the IR-4 program, has submitted a request for a national label for Goal on horseradish; and I hope the label will be granted before the 1990 planting season.

When using Goal, remember that Goal requires sunlight for herbicidal activity; therefore, germination of buried seeds or horseradish roots will not be affected. If you see a field with uneven horseradish emergence, it is probably not caused by Goal.

Horseradish can exhibit a contact (paraquatlike) burn on leaves exposed to Goal. This burn is usually along the leaf margins, and the plants rapidly grow out of the injury. There are two times when horseradish injury is likely. Injury will occur if Goal is applied after the horseradish has emerged; thus, Goal should be applied after planting horseradish but before it emerges. Injury can also occur if Goal is applied to a dry soil just before horseradish emergence. Goal is a relatively volatile herbicide; thus, if a rainfall occurs soon after emergence, Goal can volatilize from the soil surface and injure the crop. This injury problem can be avoided if you apply the Goal immediately after planting, or if you have rainfall between the Goal application and the horseradish emergence.

Keep in mind that this is a "learning year." Research done on small plots has its limitations. It cannot predict all the situations that are likely to occur as you use Goal on horseradish. For example, most of our research on Goal was done with the Swiss variety of horseradish. We had excellent tolerance up to four times the current recommended label rate. We also believe that other varieties of horseradish are tolerant to preemergence applications of Goal, but we do not have much experience with them. Thus, as Goal is used this year over most of the horseradish production area, problems can occur. If you have a problem with Goal use on horseradish, please contact John Masiunas at (217)244-4231.

Fusilade 2000 Labeled for Use on Vegetables

Fusilade 2000, a postemergence grass herbicide, is now labeled for sweet potatoes, yams, spinach, carrots, and onions. The application rate for Fusilade 2000 depends on the grass species and its size. The rates range

from 12 fluid ounces per acre (fl oz/A) for 6- to 12-inch-tall shattercane, to 24 fl oz/A for 1- to 2-inch-tall crabgrass.

There are a number of restrictions on the use of Fusilade 2000. Do not apply more than 96 fl oz/A of Fusilade 2000 per season. Fusilade 2000 must be applied to actively growing grasses. The best perennial grass control with Fusilade 2000 can be obtained if rhizomes or stolons are cut up by preplant tillage operations. Do not tank-mix Fusilade 2000 with other pesticides or liquid fertilizers. There is a different harvest interval for each crop. Do not harvest carrots or onions within 45 days after application. Do not harvest spinach within 30 days or sweet potatoes and yams within 55 days of a Fusilade 2000 application. As with any pesticide, carefully read the label before using Fusilade 2000.

Workshop Planned on Alternatives in Pest Management

Have you ever wondered how insect parasites, plant biotechnology, or allelopathic cover crops will influence your future pest control practices? A workshop on alternatives in pest management will be held November 20-21, 1989, at the Continental Regency in Peoria. The workshop is designed for practitioners (including vegetable growers), educators, policymakers, and any other persons interested in alternatives in pest management. The workshop will discuss the advantages and disadvantages of both nonchemical and pesticide-based approaches to pest control. One of the concurrent sessions will deal with pest management in vegetables. Further information will be available later.

Illinois Pest Control Handbook Available

Due to the great demand for the *Illinois Pest Control Handbook*, it has been reprinted. The *Handbook* contains valuable information on insect, weed, and disease management in vegetables and agronomic crops. If you are interested in obtaining the *Handbook*, contact Extension Entomology, 172 Natural Resources Building, 607 East Peabody Drive, Champaign, IL 61820. The cost of the *Illinois Pest Control Handbook* is \$10 per copy.

The preceding four articles were submitted by John Masiunas, Assistant Professor, Horticulture.

Squash Bugs in Pumpkins and Zucchini

Wherever pumpkins or squash are grown in North America, squash bugs are usually found sucking vital juices from the plants. Cultivated varieties originated in Central America several thousand years ago. Illinois Natural History Survey investigator Dennis Fielding believes it is likely that the squash bugs followed as squashes were introduced from tropical America by indigenous tribes about 3,000 years ago.

Today Illinois is the largest producer of pumpkins for processing; and increasing numbers of farmers are growing zucchini and other squashes for fresh markets. Even though the squash bug is a major pest of these crops, little is understood of its biology or ecology. In 1984, a study of squash bug population dynamics was begun.

Squash bugs overwinter in the adult stage. In late spring, the adults leave their overwintering sites to search for squash plants. In central Illinois, oviposition usually begins in late June and continues to mid-August. Eggs are laid in clusters, usually on the underside of the leaves. The immature nymphs molt five times before attaining adulthood. The new adults will then either produce second-generation offspring if the season is long, or they will begin to prepare for hibernation.

One factor that determines the rate of population increase during the summer is the speed at which the eggs and nymphs develop. The squash bug's rate of development depends on temperature. Like their host plants, these bugs love warm weather. At 95°F in the laboratory, they grow from egg-hatch to adult in about 16 days. Nymphs fail to grow at constant temperatures below 68°F. However, under field conditions, it was observed that nymphs may elevate their body temperatures as much as 20 degrees above air temperature by basking in sunlight. It was also noted that nymphs reared at cooler temperatures were darker than those reared at warmer temperatures, apparently because melanin was deposited in the exoskeleton during molting. Using a spectrophotometer to measure the amount of light reflected from light and dark nymphs, it was determined that nymphs reared at 73°F absorbed about 20 percent more solar energy than lighter-colored nymphs reared at 95°F. This color adaptation may be especially useful to nymphs later in the season when cool weather is hindering development.

Another factor controlling squash bug population dynamics is diapause. Diapause in squash bugs is characterized by the cessation of reproductive activity and

by a gradual decline in metabolism to a level less than half the normal rate. Because squash bugs must overwinter as adults, eggs laid too late in the season to reach adulthood before cold weather arrives represent wasted reproductive effort. Diapause is an adaptation that serves to prevent such wasted effort and to prepare the adults for hibernation. Squash bugs are long-day insects; that is, the long days of summer maintain reproduction in the population while short days will induce diapause. In central Illinois, the day length in early August is already short enough to begin to induce diapause. Bugs maturing after this time will forego reproduction until the following year.

Information regarding development rates and the timing of diapause, plus information about mortality rates and oviposition rates, was incorporated into a computer model that simulates the growth of a squash bug population over a single season. This model was then used to identify factors having the greatest impact on squash bug populations and to suggest management strategies for this pest. The time when overwintering adults break diapause and begin oviposition was also an important factor determining subsequent population growth. Even though temperatures in May and early June are favorable for squash bug development, oviposition rarely begins until late June. The relatively late start squash bugs get in the spring may be an adaptation to ensure the widespread availability of host plants when overwintering adults emerge from hibernation.

By Dennis Fielding, University of Illinois graduate student.

Handling Pesticide Spills

Handling a pesticide spill properly will reduce the environmental damage from the chemical and possibly eliminate an expensive cleanup charge. "Accidental spills are going to happen; we can't totally avoid them," says Larry Olsen, Michigan State University Cooperative Extension Service pesticide specialist. "We hope farmers will know what to do when they happen."

When a liquid pesticide is spilled, a farmer should immediately keep it from spreading by building a dam around it with dirt. The farmer should put on protective clothing as the label requires and begin soaking up as much of the spill as possible with petroleum drying substances, cat-box filler, or dry soil--whatever is available. This saturated material should be shoveled into buckets to keep the pesticide from soaking into the soil until all the concentrate has been cleaned up.

A new EPA law also requires the farmer to report spills to the local emergency planning coordinator. Under

this law, failure to report a hazardous spill can result in fines of up to \$25,000 per day, with a cap of \$125,000.

After cleaning up the spill, the farmer should take any pesticide-contaminated materials and soil to the field where he or she was planning to apply the chemical. If the spill was a herbicide, the farmer should spread it as evenly as possible on the targeted field. Olsen points out that a farmer could use a manure spreader to apply the contaminated material on the field.

"Basically, farmers should clean it up as well as possible and spread it out as thinly as possible on a legal site," Olsen said. "Farmers should never attempt to wash a spill away with water as this only spreads the spill and increases the potential for leaching."

Even if properly handled, spill cleanup can be costly. Olsen points to cleanup and repairs from a 5-gallon nematicide spill that cost the pesticide manufacturer about \$23,000. The spill happened on a paved street, so several truckloads of pavement and soil had to be removed and hauled to a hazardous waste dump. Then the road had to be replaced.

By Larry Olsen, Michigan State University Cooperative Extension pesticide specialist.

Dixon Springs Field Day Will Be August 7

Farmers, landowners, homemakers, and gardeners are invited to the University of Illinois Dixon Springs Field Day on Monday, August 7. Visitors will tour experimental plots, learn about current research, see commercial exhibits, hear lectures, and visit with University of Illinois research and Extension staff. Tours will begin at 8 a.m.

The horticulture tour includes information about growing small fruits and vegetables for local markets. You will see blueberries, blackberries, sweet corn, tomatoes, peppers, mulching, row covers, and trickle irrigation. Tours will also be available for animal health, beef cattle, field crops, forages, forestry, home economics, sheep, pest control, and the newly opened Illinois Forest Resource Center.

Buses will leave the administration area on hourly schedules beginning at 8 a.m., and they will run until 1 p.m. They will travel to different tour locations at the Center and return to the administration area. Farmers must choose which tours to take because it will be impossible to visit every location during the day. Tents will be set up for commercial exhibits and for lunch. A free barbecue lunch will be provided, courtesy of the exhibitors. For more information, call (618)695-2441.

The Dixon Springs Agricultural Center is located on

Illinois Route 145 about 25 miles south of Harrisburg, Illinois, or 25 miles north of Paducah, Kentucky.

Plans Under Way for 1990 Illinois Fruit, Vegetable, and Irrigation Convention and Trade Show

Plans are well under way for the Illinois Convention and Trade Show, January 15-18, 1990, at the Prairie Capital Convention Center, Springfield. We expect attendance to exceed 2,000.

Exhibit space has sold out each of the past five years, so exhibitors are encouraged to reserve their spaces now. A booth deposit is required by August 1 if you wish to be included in the advance publicity program and buyers' guide.

For more information or a contract, please write: Barbara Blough, Nessen Company, 1235 South Eighth Street, Springfield, IL 62703; (217)744-9350.

The educational program will be expanded in 1990 to include two full days on herb production and marketing, as well as an in-depth look at specialty crops. We will include contract vegetables, alternative crops, organic production and marketing, small fruits, and other specialty crops. Vegetable and fruit production and marketing sessions and irrigation sessions will be offered concurrently.

The last two articles were submitted by J.W. Courter, Professor, Horticulture.

1989 Market Directory Available

This year's updated version of the *Illinois Fresh Fruit and Vegetable Markets Directory* is now available. Pick-your-own markets, roadside markets, wholesalers, and farm community markets are listed by region and by county. This directory can be an effective marketing tool. To receive a copy, contact Lee M. Rife, Marketing Representative, Illinois Department of Agriculture, Division of Marketing, State Fairgrounds, P.O. Box 19281, Springfield, IL 62794-9281; (217)782-6675.

St. Charles Twilight Meeting Scheduled

A second twilight meeting is scheduled for August 8 at the St. Charles Horticulture Research Center. This meeting will allow the growers to meet the researchers and discuss the 1989 projects being carried out at the

Center. Some of the topics this year include cold tolerance in sweet corn, row tunnels for bell peppers, drip irrigation strategies for bell peppers and tomatoes, and weed control in vegetable crops. An integrated pest management workshop will be conducted earlier in the day for vegetable growers. Interested persons should contact the Kane County Extension Service office in St. Charles; call (312)584-6166. The Center is located on Illinois Route 38 east of Route 47, or about 1 mile west of Randall Road.

Union County Twilight Tour Set

On Thursday, July 6, at 5:30 p.m., a twilight tour will be held at the Bill Bass farm south of Anna, Illinois, on Route 51. Watch for signs. Bill is using trickle irrigation and plastic mulch on a wide variety of crops. A tomato variety plot is also located at Bill's farm. For

further information, contact Kevin Kirby, Extension adviser, agriculture, Union County Extension Service, RR 2, Box 305B, Anna, IL 62906; (618)833-6363.

Charles E. Voigt

Charles E. Voigt
Extension specialist
Vegetable Crops

J.W. Courter

J.W. Courter
Extension specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
Urbana, Illinois 61801

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

4. 105
2



Illinois Vegetable Farmer's Letter

COOPERATIVE EXTENSION SERVICE

COLLEGE OF AGRICULTURE
UNIVERSITY OF ILLINOIS
AT URBANA—CHAMPAIGN

Vol. 9, No. 3

November 1989

What a summer this has been! We've been so busy that at times I wondered how we would ever get through it all. I'm sure that feeling is familiar to all of you. Well, it is almost over now, with frost marking the end of many crops. There are, of course, still many things to keep us occupied in the coming months. Evaluating what I saw all summer and arranging slides for use this winter are large tasks still ahead.

Our staffing has changed so that there are fewer of us doing vegetable crops Extension. That has made us hustle to figure out the new order of things. I was involved in getting the Illinois Herb Association organized and formed. This year's convention in Springfield (January 15-18, 1990) will feature a wider range of topics than ever, and we've been hard at work lining that up. Things are changing rapidly in terms of chemical availability; and the push toward organics, sustainability, and environmental responsibility in general goes on. These are some examples of the things that will be discussed in this issue.

John M. Gerber to Head Sustainable Agriculture Efforts

W.R. ("Reg") Gomes, dean of the University of Illinois College of Agriculture, has recently announced the appointment of John M. Gerber as assistant director of the Agricultural Experiment Station with primary responsibility as coordinator of the College's Sustainable Agriculture initiative. Gerber fills the position held by Harvey J. Schweitzer, who has retired.

Making the announcement, Gomes said "We expect Gerber to provide aggressive leadership and visibility to our research and educational programs in sustainable agriculture. We need to consider sustainability along with productivity in this era of increased environmental and social concerns."

Donald A. Holt, director of the Agricultural Experiment Station, noted that Gerber's position will complement the position recently assumed by Donald E. Kuhlman as the College's program leader for environmental issues. "Kuhlman will focus outward as our spokesperson on environmental issues, and Gerber will focus inward on the development of stronger research and education programs in the College," Hoit said. "We expect them to work very closely together."

However, Sustainable Agriculture's gain is our loss. Dr. Gerber has been active in vegetable crops Extension work since his arrival at the University in November 1979. As chairman of the Illinois Fruit and Vegetable Growers Convention, he helped build a local meeting of 200 farmers into a Midwest event that now attracts more than 2,000 participants. During that time, he also provided guidance in the formation of the Illinois Specialty Growers, which represents fruit and vegetable growers, growers, irrigators, and herb producers throughout the state. We will miss his energy and program development skills but look forward to interacting with John in his new capacity.

Illinois Fruit, Vegetable, and Irrigation Convention

The 1990 Illinois Fruit, Vegetable, and Irrigation Convention will be held January 15-18 at the Prairie Capital Convention Center in Springfield. The newly formed Illinois Herb Association will also participate in the convention, which will be renamed the Illinois Specialty Crop Association Convention.

Educational session topics will include farm marketing, vegetable and fruit crops, pesticide issues, organics, heirloom crops, contract vegetables, irrigation, farm labor, and farmers' markets. Informal discussion sessions to be held Tuesday evening will give participants a chance to interact with some of the main speakers from the educational sessions.

As always, this convention is an ambitious undertaking. The program is pretty well set, and the trade show is rapidly filling up. We expect more than 2,000 people

AGRICULTURE LIBRARY

DEC 01 1989

UNIVERSITY OF ILLINOIS

to attend, with more than 200 exhibitors participating in the trade show. A variety of sessions will be offered concurrently. Tapes of sessions missed due to time conflicts will be available in the convention center. Other highlights include a cider tasting event and a reception in the old state capitol.

For more information or to check on the availability of trade show space, please write or call:

Barbara Blough
Nessen Company
1235 South Eighth Street
Springfield, IL 62703
(217) 744-9350

We've worked hard to make this year's convention as interesting, informative, and exciting as possible. Come and see how successful we have been.

Illinois Herb Association Formed

The Illinois Herb Association (IHA) was recently formed to promote herbs, herbal products, and everlastings. Approximately 40 growers organized the new association at the University of Illinois on August 20, 1989.

The Illinois Herb Association's goals are to increase the public's knowledge of herbs and to assist producers in growing and marketing herbs and herbal products. Members are interested in organic production and certification, developing quality standards, and participating in trade shows and festivals.

Newly elected officers of the IHA are: Marilyn Miller of Bluford, president; Una French of Dix, vice president; Vana LaCost of Kankakee, secretary; Caroline Shertz of Low Point, treasurer; Pat Neighbors of Flat Rock, director; Joyce Cisna of Mattoon, director; Mike King of Decatur, director; and Becky Anderson of Marseilles, director. Charles Voigt, University of Illinois, and Don Naylor, Illinois Farm Bureau, provided leadership in helping to form the new IHA.

Charter memberships are available through December. For further information about the IHA, contact the Illinois Herb Association, c/o Don Naylor, 1701 Towanda Avenue, Bloomington, IL 61701. Phone: (309) 557-3251.

The Illinois Specialty Growers Association (formerly the Illinois Fruit and Vegetable Growers Foundation) welcomes the IHA, who will join ranks with vegetable and fruit growers and irrigators for their winter convention at the Prairie Capital Convention Center in Springfield. The IHA will offer two full days of educational sessions on January 16 and 17. Their first annual meeting will be held on the afternoon of January 17.

The convention's herb program will feature production and marketing topics presented by internationally known speakers. They include Adelma Simmons, Caprilands Herb Farm; Marilyn Hampstead, Fox Hill Farm; Ralph Cramer, Cramer's Posie Patch; Maurine Buehrle, executive director, International Herb Growers Association; Cathy Krezak-Larsen, Frontier Cooperative Herbs; and Steven Foster, author of *Peterson's Field Guide to Medicinal Plants*.

Cabbage and Broccoli to Be Featured at the Convention

The 1990 Fruit, Vegetable, and Irrigation Convention will feature all-day sessions on January 16 concentrating on cabbage and broccoli production. The theme will be integrated pest management (IPM) practices in growing cole crops.

During the morning session experts will share information on growing and research. Talks by growers Don Ahrens of Harvard and Warren Ouwenga of Manteno will be particularly informative. Another highlight of the morning program will be Dr. Bob Becker discussing cultural practices and cultivar selection as the foundation of an IPM program in cabbage production. Dr. Becker has won numerous awards during his long, distinguished career with the New York state vegetable growers.

The afternoon session will feature Dr. Herb Hopen from the University of Wisconsin. Dr. Hopen, an expert on weed control in cabbage and broccoli, is well remembered for his years of service in the Illinois vegetable industry. The afternoon program will also include Drs. Roscoe Randell and Darin Eastburn discussing the current status of integrated insect and disease management in cabbage and broccoli. Dr. Cathy Eastman will review research results on diamondback moth management. Diamondback moths have developed resistance to insecticides commonly used in broccoli and cabbage. Thus, the cole crop session promises to be informative for growers of cabbage and broccoli.

Organic Production and Marketing to Be Highlighted

Organic food production will be a highlight of the 1990 Illinois Fruit, Vegetable, and Irrigation Convention held January 15-18 in Springfield. Organic fruits and vegetables represent an area of growing consumer demand, offering opportunities to growers. The convention will bring together organic growers and marketers to discuss topics of concern including production, marketing, organic laws, and certification.

The organic program, cosponsored by the Illinois Fruit and Vegetable Foundation and the Illinois Sustainable Agriculture Society, starts January 16 with an evening discussion. Wednesday morning sessions will address fruit production and growing organic grains in the Midwest. Kathy Rittenhouse, chairperson of the California Certified Organic Farmers, Beef Certification Program, will provide insights on what feedstocks are needed for organic beef production.

The afternoon session will highlight organic vegetable production and feature Illinois growers Sheila and Terry Holsapple and Mike Michael. Reiny Jucngling, area manager of the Kroger Company, will also speak on marketing organic foods through retail stores.

The final day will provide a forum for developing an organic organization in Illinois. Kate Duesterberg of Illinois South will present the group's efforts in organizing organic farmers in Illinois. State Representative John Novak will discuss efforts to enact an organic law for Illinois. The afternoon session will be open for discussing organization and certification.

Alternatives in Pest Management Conference to Feature Workshop on Vegetable Crops

The Alternatives in Pest Management Conference will feature a workshop on Alternatives in Vegetable Pest Management. The conference will be held November 20 and 21 at the Continental Regency Hotel in Peoria.

The workshop on vegetable pest management will be moderated by Dr. Bill Courter and feature both growers and university experts. The vegetable growers on the panel are Mr. Scott Talbott of Manito and Mr. Warren Owenga of Manteno. Owenga is president of the Illinois Vegetable Growers Association. Dr. Jeffery Wyman, professor and Extension entomologist from the University of Wisconsin, will present information on integrated pest management in vegetable crops. Dr. Wyman is an expert on insect thresholds in vegetable crops. Drs. Darin Eastburn and John Masiunas of the University of Illinois will discuss alternatives in disease and weed management.

The registration deadline is November 13. To register by phone, call (217) 244-7659. If you have questions concerning the workshop, contact Joan Cornell, program secretary, at (217) 333-2881.

The previous three articles were submitted by Dr. John Masiunas, Assistant Professor, Department of Horticulture.

Suspending the Use of Mancozeb and Other EDBC Fungicides

On September 6, 1989, du Pont, Pennwalt, and Rohm & Haas announced that they are voluntarily suspending the labeled use of Mancozeb, Maneb, and other EDBC fungicides on a number of crops, including many vegetable crops. Apparently, the companies are taking this action in response to pressure from several special interest groups that have questioned the safety of food crops treated with these fungicides. This suspension includes fungicides marketed under the trade names Manzate 200, Dithane M-45, Pencozeb, and others.

Du Pont has suspended the use of Manzate 200 on 19 food crops including carrots, celery, fennel, cucumbers, melons, and squash (winter and summer). Manzate 200 will still be labeled for use on asparagus, onions, potatoes, popcorn, sweet corn, tomatoes, and several other food crops. The label for use on nonfood crops and as seed treatments will remain unchanged for the present. Labels for Dithane, Pencozeb, and others will be similarly restricted.

The request for voluntary suspension of use has been sent to the Environmental Protection Agency (EPA), which will ultimately decide how long growers may continue to use products they have already purchased and how long dealers may continue to sell their remaining inventory. There is also a period of time in which the general public can respond to make their desires and needs known to the EPA. Those of you wishing to express your opinion on the subject are encouraged to contact your legislators (state and federal senators and representatives), the Illinois Department of Agriculture, and the EPA.

Even though the use of these products is being voluntarily restricted, groups such as the National Resource Defense Council (NRDC) may continue to publicize their concerns about the health risks of eating fruits and vegetables treated with EDBC fungicides. This may result in a situation similar to that of Alar. However, growers should be advised that these are *proposed* label changes, and that these products can be used according to current label directions until acted upon by the EPA. Thus, Mancozeb can continue to be used for the remainder of this season, and possibly for all or part of next season.

Submitted by Dr. Darin Eastburn, Department of Plant Pathology.

Amiben Will Not Be Re-Registered

Amiben (registered for snapbeans, lima beans, cucumbers, muskmelons, pumpkins, squash, tomatoes, and peppers) will not be re-registered. Any Amiben that you

or your supplier currently have can be used, but it will be difficult to obtain Amiben as supplies decrease. What can replace Amiben? The replacement depends on the crop and weed problem. In some crops there are no herbicide replacements.

Direct-seeded cucumbers, melons, and watermelons. Prefar and Alanap or Curbit can be used instead of Amiben. Use Prefar and Alanap as a tank mix, incorporating them about 1 inch deep. Apply Prefar at 6 to 8 quarts per acre and Alanap at 4 to 6 quarts per acre. A second application of Alanap just before the crop vines out may be necessary to extend weed control.

Curbit, labeled this spring for direct-seeded cucumbers, muskmelons, and watermelons, should be applied at 3 to 4 quarts per acre depending on the soil type. Apply Curbit to the surface within two days after seeding the crop. Rainfall or irrigation within five days of treatment is necessary to activate the herbicide. Crop injury from Curbit is possible if cool, wet weather or heavy rainfall occur soon after application. Signing a crop injury waiver is required.

Snapbeans and lima beans. The herbicide replacements in snapbeans and lima beans depend on the weed problem. If Amiben is used to control broadleaf weeds such as lambsquarter and purslane, then a postemergence application of Basagran can replace it. Amiben used to control pigweed and nightshades can be replaced with Dual.

Tomatoes and peppers. Amiben is mainly used to control eastern black nightshade and other difficult broadleaf weeds in established transplants. No herbicide substitute exists for this use. A strategy in tomatoes is to preplant incorporate a tank mix of Treflan and Lexone/Sencor, and then cultivate and hand hoe any weeds that emerge. In peppers, either Treflan or Devrinol should be used. If you have a small area of tomatoes or peppers, use black plastic mulch to control weeds within the row.

Pumpkins. Command is currently labeled for pumpkins and can replace Amiben, although problems with its use exist. The weeds controlled by Command differ from those controlled by Amiben. For example, Command does not control redroot pigweed, and there are no good alternatives to control weeds missed by Command in pumpkins. Command can also carry over and injure some subsequent crops. Follow the Command label closely to avoid injuring follow crops.

Squash. Controlling weeds in squash without Amiben presents some unique problems. Only Dacthal can be used in squash to control weeds before they emerge. Dacthal must be used once squash plants have 4 to 5 leaves and are well established. Squash injury may occur if Dacthal is used earlier than recommended or if the weather is unfavorable for crop growth. Black plastic mulch may be an option for weed control within squash

rows. The IR-4 program is conducting research to register new herbicides for squash.

Submitted by Dr. John Masiunas, Assistant Professor, Department of Horticulture.

Are You Adequately Insured?

No area of commerce, including farming, has escaped the effects of the current crisis in liability insurance. We have all read stories about skyrocketing premiums, municipalities and businesses that have lost their insurance, and the attempts of legislators to pass emergency measures to correct the problem.

Some policies may offer less coverage with higher deductibles. You may be tempted to go without coverage rather than pay the new higher premium, rationalizing that you've never had a liability claim or that you really don't need the coverage. Or you may believe that your current farm liability policy is broad enough to cover your farm stand turned fruit and vegetable store that also carries a variety of hard goods. But when someone trips over a pallet and a certified letter arrives from the claimant's attorney, you may discover that you are not adequately covered.

Why all the fuss? Consider the following scenarios:

- A customer at a pick-your-own operation, despite warnings not to climb, improperly places a ladder, which then breaks while the customer is climbing it. Now partially paralyzed, the claimant receives an award of \$300,000 under a farm policy.
- A customer at a farm market walks into a hanging basket of flowers. The slight bump on the head costs the insurance company \$500.

Dog bites, protruding wires on baskets, and hoses left where someone could trip over them can all cost you doctor bills and perhaps subpoenas. It's just good business to protect your investment adequately. Any one of us could be sued. Today's public has been made very aware of the financial restitution for injury available through the legal system.

What does liability insurance do for you? First, it agrees to pay others the amount you are legally obligated to pay because of bodily injury or property damage. Second, it agrees to defend you in case you are sued.

Does insurance cover everything or every occurrence? Absolutely not! Each type of liability insurance is designed for a specific purpose and the language of the policy excludes other exposures.

Certain insurances are required by statute. Depending upon the jurisdiction, the law may require that you have

automobile insurance, worker's compensation, employers' liability, disability benefits, unemployment insurance, and FICA.

In the absence of a statutory requirement, no direct marketer should be without a workers' compensation policy that covers the obligation imposed by statute or common law. Even in those states where there is a "gray area" regarding farm workers, the direct marketer flirts with disaster by not obtaining workers' compensation insurance as the operation becomes less of a farm and more of a mercantile operation.

Of course, automobile insurance is a must. It should be in place with adequate coverage and limits. Does it cover your hired help who use their own cars on errands for you?

Don't assume that your policy automatically covers everything--particularly if your farm operation has begun to look more and more like a main street business. The term "premises and operations" says it all. You have liability exposures that result from the fact that you own your farm or place of business (premises). You have additional exposures resulting from the operations you conduct. In the case of a direct marketer, these range from basic farming operations to sophisticated wholesale and retail marketing.

If you live where you run your business, the insurance program must cover family bicycles and stereos along with tractors and implements. The very nature of farming and direct marketing creates a variety of unusual exposures to loss that require insurance protection.

What can you do? You are a professional in your field. Be sure to choose an insurance agent who is a professional in the field of insurance.

Know every detail about your business. Do your homework. Provide your agent with a comprehensive description of your entire operation. List all the property you own. Identify the occupants of tenant houses. Describe the nature of any business relationship between you and your children.

List all of the things you do in your business, no matter how insignificant they may seem. Do you deliver produce to a chain store? Is a certificate of insurance protecting the chain store required? Did you sign a "hold harmless" agreement when you rented the stall at the farmers' market? Have you assumed anyone else's liability contractually? Do you buy and sell produce or supplies?

Only your complete analysis of your operation can help your agent design a comprehensive program of insurance that will provide adequate protection.

A competent insurance agent can also suggest ways to reduce liability risk in the operation of your business.

From an article by Frank Becker in American Vegetable Grower.

Organic Label Need Cited

To ensure compliance by its more than 250 members in the United States and Canada, the Organic Foods Production Association of North America is tightening certification management guidelines and surveying compliance across the continent.

"The organic food industry is intensifying efforts to police itself and uphold the highest standards of authenticity," said Bill Wolf, an executive board member and president of Necessary Trading Co., which is conducting the survey.

"As more conventional growers and processors offer organic products to meet consumer demand, this response by the organic industry trade group is critical to maintaining public confidence in the integrity of the foodstuffs on the U.S. and Canadian market," he said.

Certification groups have established strict production standards regarding methods and materials used to grow, process, store, transport, and sell organic products. These groups inspect farms and food processors annually and grant certification if operations comply.

The study indicates certification organizations strongly agree about what growers may or may not use as fertilizers, insecticides, and soil additives when producing safe organic foods.

From an article in The Packer, October 2, 1989.

Illinois Organic Bill

A bill to define organics recently passed in the Illinois legislature, but was vetoed by the governor. Part of the focus of the organic sessions at the January convention in Springfield will be to generate a definition of organics that is workable and compatible with national standards for organic produce. If these concerns can be addressed, it is thought that Governor Thompson might look more favorably on such a bill. Your input is welcome, either at the convention or directly with us at the University. Some standards need to be set to keep Illinois organic growers competitive with growers in surrounding states that already have such definitions, standards, and labeling laws.

Report Predicts "Alternative Pesticides" as Growth Market

An emerging world market for "alternative" microbiological and biochemical pesticides could be worth \$8 billion by the year 2000, according to a new 350-page study from Frost & Sullivan. Such a bullish view assumes that regulatory treatment, market acceptance, and performance ratings will be immediately favorable.

The report, "The Impact of Biotechnology on Pesticides in the U.S.," cautions would-be participants to "become positioned for survival." "Many of the genetically engineered products coming out of the laboratory over the next few years will need to sustain three to five years or longer of large-scale field testing and clearance before market release," the report said. "For those who can survive this passage, the rewards will be the ability to participate in a market that could reach \$1 billion to \$2 billion within 10 to 15 years in the United States and \$6 billion to \$8 billion worldwide."

The report also advises both large and small companies to develop strong expertise and proprietary processes in targeted key technologies; select "appropriate problems to solve within high value markets"; consider strategic relationships for research, production, marketing, distribution, and financing; and think in terms of large-scale production. Currently the chemical pesticide industry faces relatively slow growth because of decline in prices, land under cultivation, and intensity of chemical pesticide use.

Alternative pesticides will be developed from several core technologies, the report said. Recombinant DNA techniques will create microorganisms to be used as pesticides, disease suppressants, chemical detoxicants, and as a means of making crop plants more intrinsically pest-resistant. The report predicted that bioprocessing will produce large quantities of alternative pest controls efficiently and at lower costs.

Alternative insecticides and herbicides are expected to include bacteria, viruses, fungi, and other microorganisms, as well as regulator/messenger-control chemicals.

For more information, contact Customer Service, Frost & Sullivan Inc., 106 Fulton St., New York, NY 10038. Phone: (212) 233-1080.

From an article in The Packer, May 6, 1989.

Study: Vegetables Up, Cancer Down

A recent study finds a strong relationship between eating vegetables and a lower risk of lung cancer. A team of

Hawaiian scientists compared the diet of 332 Hawaiian lung cancer patients to that of 865 healthy residents and discovered that eating vegetables has a protective effect, according to the August 2 edition of *The Fresno Bee*.

The scientists, who announced the results August 1, found that the protective effect stemmed from vegetables as a class rather than any single vegetable or known component. Although previous studies have linked vitamin A with a lower risk of lung cancer, the Hawaiian study found a diet rich in vitamin A alone was less protective than a vegetable-rich diet.

The protective effect of vegetables appeared to extend to men and women and representatives of the Japanese, Caucasian, Hawaiian, Filipino, and Chinese ethnic groups studied.

From The Packer, August 19, 1989.

Tomatoes Become Latest Hope for Lowering Cholesterol

Products or foods that can genuinely lower cholesterol levels could quickly become overnight sensations and hot property for the people making or producing them. That's why any report about a link between cholesterol and a foodstuff rates big headlines.

Andrew Procter, a food chemist at Ohio State University, touts tomato fiber as the next foodstuff that may have the elusive trait that health-conscious consumers are craving--the ability to lower cholesterol levels. He quickly cautions, however, that it's too early to tell exactly how important this link may become.

Through laboratory experiments, Procter concluded that tomato fiber may decrease the amount of cholesterol that gets into the bloodstream. The reasoning behind why this happens is complex; but in the laboratory at least, the theory seems sound.

Although many questions remain, clinical studies do suggest a strong link between consuming the kind of fiber found in tomatoes and lower cholesterol levels.

From an article in the Prairie Farmer, March 21, 1989.

Asparagus Update

The 1989 asparagus harvest year was a pleasant surprise to all. With heat and drought during the summer of 1988, many people thought asparagus yields would be lower due to low soil moisture throughout most of the season. But despite last year's adverse conditions, 1989 yields were the highest ever.

The reasons for this, I believe, are as follows. First, it shows that the asparagus root system, once established for

a few years, can seek moisture deep into the soil, thus ensuring its survivability. Also, the spring of 1989 was "ideal" in that the temperature stayed cool until April 22 without fluctuating up and down, which would have caused the asparagus to come early and then get frosted out.

We did receive one frost, but it was very light and, for the most part, harvest was able to proceed without any large setbacks. As a result, growers who have harvested for their fourth consecutive year after planting, harvested about 3,000 to 3,500 pounds per acre (lbs/A).

Actual growers' yields in northwestern Illinois for those who planted one-year-old hybrid Syn 4-51 crowns in 1985 are as follows:

1986 - 500 lbs/A
 1987 - 1,000 lbs/A
 1988 - 2,000 to 2,500 lbs/A
 1989 - 3,000 to 3,500 lbs/A

1990 New Jersey Hybrid Asparagus Varieties

One-year-old crowns of the following New Jersey hybrid varieties will be available to growers for the 1990 planting season:

Jersey Giant (56 x 22-8). Now available, containing 100-percent all-male plants. A high yielding variety.

Jersey Knight (277C x 22-8). Also an all-male hybrid that has done exceptionally well in my variety trial in the heavier soils of Illinois.

Jersey Prince (51 x 22-8). Also does excellently in heavier soils and is the one from which growers are obtaining high yields (3,000 to 3,500 lbs/A) in northern Illinois. It is also all-male.

Greenwich (53 x 22-8). An all-male hybrid that does well in lighter soils.

Synthetic 4-56 (Syn 4-56). The "mixed" Jersey Giant, with 85-percent male and 15-percent female plants. Still a high-yielding variety in spite of the small population of female plants.

Jersey Centennial (51 x 22). A good hybrid containing 50-percent male and 50-percent female plants. Does not yield as high as the all-male hybrids initially, but catches up later.

New Asparagus Insect Problem

In the summer of 1988, the European asparagus aphid was observed feeding on asparagus in three Illinois

counties. Entomologists believe that they probably migrated into Illinois from Indiana. At the time of this writing, the aphids seem to be isolated and there have been no new reports of them feeding in other counties.

The aphids are green and smaller than the common green peach aphid. They start feeding on the mature ferns after harvest. As they feed, the fern will take on a dwarfed, dense, bonsai appearance. The leaves on the bottom part of the fern will turn brown and fall off. Often, as the aphid population increases, many lady bug larvae will be seen feeding on the aphids. Unfortunately, this biological control does not take care of all the aphids.

Chemical control is needed because as the aphids feed, they inject a toxin that causes the dwarfed appearance of the fern as well as all the buds on the crown to send up spears at the same time. This leads to a tremendous energy expenditure in the crown to release all of the buds at once, which prevents the plant from sending any food materials to be stored in the crown for next year's crop. The crown is then depleted of all nutrients and usually dies by the following spring.

Control measures can be applied after the dwarfing symptoms are noticed. Malathion can be used, but it does not provide enough residual control to be effective. Di-Syston 8, a liquid systemic insecticide, has recently received a Section 24-c label clearance for use in Illinois for the control of the European asparagus aphid. It is a restricted-use chemical so you must be certified as a private pesticide applicator. Be sure to *read the label* and *follow all safety precautions* when using this material.

Asparagus School Proceedings Available

Each year for the last several years Carl Cantaluppi, horticulture adviser in Rock Island County, has conducted an Illinois Asparagus School. Proceedings from the 1987, 1988, and 1989 schools are now available for \$5 each. Make checks payable to Rock Island County Extension Service. Send requests to:

Carl Cantaluppi
 Extension Adviser, Horticulture
 Rock Island County
 1188 John Deere Road
 East Moline, IL 61244
 (309) 796-0512

Carl has done a fine job of conducting this school, promoting the wider planting of asparagus in Illinois, and providing support and leadership to the growers in the state.

The articles on asparagus were submitted by Carl Cantaluppi, Extension Adviser, Horticulture.

Cover Crops Improve Soil Structure

Many intensive vegetable farms badly need cropping programs that will either improve soil structure when it is poor or maintain it when it is good. A soil with good structure is the foundation for high crop yields and good economic returns from the fertilizer, lime, pesticides, and other materials used. Without good soil structure, plant roots are restricted in the volume of soil they occupy and have drastically reduced efficiency in water and mineral uptake. Consequently, unless the growing season is exceptionally favorable, yields will be substantially lower than they should have been for the amount of money spent trying to grow a good crop. Since the weather is often too wet, too dry, too hot, or too cold, we should start off the season with fields that have good soil structure to give the crop the best possible situation for coping with adverse weather.

Of course, the easiest way to keep good soil structure is to have farm enterprises that involve dairy or other animals. Then, each year, put part of the land into sod type forages and also return the manure to the fields. However, not many growers are in a position to have a combination vegetable/livestock farm. The challenge is to accomplish the same ends on a row crop farm. A few vegetable growers have been working with neighboring dairymen. Some actually swap land so that alfalfa is grown for a few years. Other vegetable growers are contracting with dairymen to supply alfalfa. These operations are reasonably economical and do a fine job of improving soil structure.

Unfortunately, many vegetable operations are not set up for animal enterprise systems; and when each field must be cropped every year, poor soil structure eventually becomes a serious problem. Seeding fall cover crops helps prevent the soil structure from deteriorating rapidly. The best results are obtained from cover crops that have a heavy, fibrous root system. They aid soil structure much more than does the same amount of material from plant tops. Although plant tops are helpful, they do not provide the great improvement in structure that comes from growing a heavy, fibrous-rooted crop, perhaps with little top growth.

The best cover crop for improving soil structure is perennial rye grass. However, it is slow to start and needs warm temperatures. August seeding is preferred and if planted after September 15, it often fails completely. Many fields cannot be planted early, and rye is a good second choice. It is often successful when planted well into October. Root growth is not as heavy as with rye grass, but it prevents erosion and, if allowed to grow in the spring, produces considerable top growth.

Growers sometimes encounter problems in the spring with rank growing cover crops like rye. Sometimes the soil becomes too dry and the tops grow so tall that they

cannot be turned under with normal plowing techniques. Two conditions need to be watched closely in the spring--soil moisture and cover crop height. Growers should either plow or treat with a chemical when either soil moisture or plant height reach the right stage. In fact, a few growers prefer to treat with a chemical ahead of plowing because the chemical tends to promote decay and prevent regrowth of any clumps not turned under completely.

Roundup at 1 quart per acre will cause stunting and prevent excessive growth; two or three quarts will give slow kill. Paraquat at low rates causes some leaf burn but not much stunting. At rates recommended for no-till, paraquat will give rapid kill.

Suggested over-winter cover crops include:

Oats (any variety). Seeded at the rate of 60 to 100 pounds per acre (lbs/A) during August or early September they will provide a good cover crop that will die out during the winter.

Rye or wheat (any variety). Can be seeded at the rate of 80 to 110 lbs/A after early September. These crops could also provide strips for wind protection early in the following season.

Rye-grass (domestic--a mixture of annual and perennial). Can be seeded at 15 lbs/A before September and up to late September.

Aroostook rye. Developed in Maine for cold tolerance cover crop.

Written by Dr. Robert Sweet, Department of Vegetable Crops, Cornell University, for the Blackdirt Newsletter, August 1987.

Africanized Bees' U.S. Arrival Delayed

U.S. Department of Agriculture plant protection officials reported earlier this week that the Africanized honey bee has been found 400 miles south of the Texas-Mexico border near Tecolutla, Veracruz, Mexico.

The migrating bee was originally expected to reach the southern U.S. by 1987 or 1988, but estimates now indicate that Texans in the Rio Grande River Valley will not see the bee for another 18 months or more.

"Our two-year cooperative effort with Mexico to slow the movement of the Africanized bee has delayed the bee's arrival in the United States," said James W. Glasser, administrator of the USDA's Animal and Plant Health Inspection Service (APHIS). "This delay should give researchers and beekeepers enough time to study the bee and learn to manage it."

The Africanized honey bee is the hybrid offspring of European honey bees and pure African queens brought to Brazil in 1956 for research. Under circumstances that

remain unexplained, the African queens escaped into the Brazilian countryside and began interbreeding with native honey bees. Africanized bees have since spread northward and were found in southern Mexico in late 1986.

APHIS and its Mexican counterpart began operating the Cooperative Program for the Control of Africanized Honey Bees in September 1987. Since then, they have worked in two areas along Mexico's Pacific and Gulf coasts to develop ways to manage the Africanized bee and encourage hybridization to produce a bee more like the docile variety common to the United States.

The cooperative program operates two trap lines along Mexico's Gulf coast in the states of Tamaulipas and Veracruz. These trap lines will be used to detect and track the movement of the Africanized bee as it nears the U.S. border.

According to Glosser, scientists in the USDA's Agricultural Research Service (ARS) have studied Africanized bee behavior and genetics for more than 15 years. "Our colleagues in ARS have worked closely with us on this project from the beginning, and their research supports the goals of the cooperative program," Glosser said. ARS also provides technical guidance and operates a 24-hour on-call laboratory for identification of suspected Africanized bees from interceptions in the United States and Mexico. Africanized bees have been found several times in U.S. ports aboard ships from South and Central America, but all of these bees were killed.

One of the cooperative program's more visible activities involves surveying for populations of Africanized bees and trapping and destroying them to reduce these populations. Traps designed to capture bee swarms are laced with a pheromone lure, or chemical message, that says "This is a good nesting site." The traps are placed in trees around the countryside and checked every two weeks. Any bees found in a trap are killed and sent to a program laboratory for identification.

"Program personnel in Mexico have hung almost 60,000 traps in the last 18 months and have caught more than 11,000 swarms of Africanized bees. That's millions of Africanized bees that will never reach the United States," Glosser said.

The program also works to reduce the transfer of Africanized traits to managed honey bee colonies through requeening. Requeening encourages beekeepers to select queens from desirable genetic stock and mark them with a bright paint so it's easy to tell if they are in the hive. An unmarked queen found in a hive could be Africanized, so she is replaced with another marked queen known to be of good genetic stock.

Glosser said one of the most important benefits gained from cooperating with Mexico is a better understanding of how to manage Africanized bees. This technology is

already being transferred to the Mexican public and can be used to educate the U.S. public too.

From an article in Illinois Agri-News, September 22, 1989.

Sprout Growers Form Association

A small group representing green leaf and bean sprout growers across the nation and in Canada have formed the International Sprout Growers Association. The purpose of the new organization is to further the prosperity and development of the sprout industry.

For a number of years, commercial growers of alfalfa and bean sprouts have considered forming an association to further the development of their diverse and widely distributed industry. "Because of the ever-changing economic situation and the market conditions in the sprout business, we believed the time was right to get our association established," Steering Committee Chairman Bob Phipps said.

A large producer of alfalfa and bean sprouts in San Antonio, Texas, Phipps was a major force in the formation of the new international association, as was Bryan Herr, Houston grower and manufacturer of sprout production equipment, a news release said. "Our industry has matured to the level that we have to organize if we are to continue to grow," First Vice Chairman Herr said.

The past 10 to 15 years have seen the emergence of sprouts as a major agriculture product. According to Phipps, "One of our problems is we really don't know how big the sprout industry is or how many commercial growers there are across the country. Our best guess is that we are about a \$300 million a year industry with anywhere from 300 to 600 commercial growers in the United States and Canada."

Membership in the association is open to commercial sprout growers, sprout industry suppliers, and sprout consumers and marketers. "There are about 26 charter association members now with more applications coming in daily," Staff Director Ken Young said October 16.

For more information, contact the International Sprout Growers Association, 7300 Lincolnshire, Suite 200, Sacramento, CA 95823. Phone: (916) 399-9846.

From an article in The Packer, October 21, 1989.

New Pumpkin Weight Record

The pumpkin-growing world has crowned a new champion--a record 755-pounder that measures more than 12 feet around. The entry of a retired agriculture

agent from Canada, Gordon Thomson, was 84 pounds heavier than the previous record of 671 pounds set in 1986 at the international World Pumpkin Weigh-Off.

"It acted like Number One from the time it started," Thomson, of Hemmingford, Quebec, said. He said he owes his success to quality seed, a lot of luck, and "good Holstein cow manure." "If you're used to agriculture and growing things, you can see when you've got something different," Thomson said.

Thomson brought his pumpkin to Collins, New York from Canada in the bed of a pickup truck. It tipped the scales at 755 pounds, measuring 151.5 inches in circumference. Thompson won \$3,000. Organizers of the seventh annual event said no pumpkin weighing more than 700 pounds had ever been recorded before Thomson's winner. There is a standing prize of \$10,000 offered for the first 1,000-pound pumpkin.

The Collins-based World Pumpkin Confederation, a group of growers and other pumpkin enthusiasts, is host

for the competition. Volunteers from the group help weigh pumpkins in Collins and take telephone calls during the event from weigh stations in 21 other spots in the United States, Canada, Belgium, Australia, and England.

Thomson's pumpkin was not the only record-breaker at the competition. Leonard Stepflug of Honeoye Falls, New York had the winning squash at 743 pounds, and Waddell Estep of Donaldson, Arkansas grew the largest watermelon at 227.5 pounds. Each received \$1,000.

From an article in the Paducah Sun, October 10, 1989.

Charles E. Voigt

Charles E. Voigt
Extension specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Librarian & Mails Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



Spring is in the air, and another planting season is upon us. As you return to your fields, you may want to consider the suggestions offered in this issue and to incorporate them into your growing systems. Some of them may help you work better, faster, or more safely in the coming year.

Selling nutrition, food safety, and the rural experience have all become part of the job for vegetable farmers in the 1990s. This month we have some good news on residue tests, which you may be able to use to ease customer fears in the coming year. Despite all the grim speculation in the last few years about pesticide residue, considerable evidence exists that produce reduces cancer risks. With your produce, you are selling increased health, not increased risk.

The 1991 convention and trade show of the Illinois Specialty Growers Association is now history. In many ways, the program was the best yet. Workshops offered in-depth studies of various topics, from weed management to growing and marketing herbs. Attendance figures and some personal contacts have led me to believe that the formula is not yet perfect. If you have comments on how the program, fee structure, trade show, or other aspects of the convention can be improved, please let Bill Courter, Bill Shoemaker, or myself know what you think. We all work hard putting the convention together, and we want to see as many of you there and happy as we possibly can.

Sometimes, especially with specialty produce, suggestions for use can help customers develop a taste for what you grow. Recipes that use a variety of items produced on Illinois farms make good handouts at markets. I'm going to try to include at least one of these in each future issue. These will be meant as examples, not as recommendations of particular dishes. You will have to try them yourselves to determine whether or not you can put your own personal stamp of approval on them.

One-Third of All Farm Accidents Happen During Planting Season

Before farmers can make it to the fall harvest, they have to get through the spring planting season. While much emphasis is placed on safety during

the harvest, safety is just as important during planting. Nearly one-third of all farming-related accidents, deaths, and injuries occur in April, May, and June—the heart of the planting season.

"There is a high level of activity on the farm in spring, so time is at a premium. Safety measures should not be ignored to make up or save time," said Jim Williams, a farm safety expert with the Country Companies insurance and investment group. Country Mutual Insurance Company is the largest farm insurer in the state.

During the past four years, 53 Illinois farmers have died in farm-related accidents during the planting season, according to research by the Country Companies. In addition, more than 40 people have sustained major injuries from farm-related mishaps. The insurance group monitors farm accidents reported in Illinois newspapers.

"Two of the most common types of accidents occurring in the spring are related to tractors and agricultural chemicals," Williams said. Tractor roll-overs are the most common tractor accidents and account for two-thirds of farm accident deaths. To ensure their safety, Williams suggests fitting all tractors with seat belts and roll-over protective structures.

He also recommends these basic tractor safety tips:

- Never dismount or service a tractor while the power take-off is running.
- Slow down for hillsides, rough ground, and sharp turns.
- Avoid sudden starts and stops.

From Illinois AgriNews, May 18, 1990.

Remember Your Personal Protective Equipment When Spraying

Pesticides can enter your body through many routes, but the most common are through skin contact or inhalation. Fortunately, protective equipment can prevent that, but it's up to you to read and follow label directions on protective equipment.

The University of Missouri-Columbia offers these guidelines on protective equipment for handling pesticides:

When using any pesticide, at least wear a long-sleeved shirt and long trousers or coveralls, all of closely woven fabric. When handling pesticide concentrates during mixing and loading of highly toxic materials, also wear rubber gloves, rubber boots, and a lightweight rubber apron. Always wear unlined, elbow-length neoprene or rubber gloves when handling any pesticide labeled with the signal words



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

AGRICULTURE LIBRARY

MAR 22 1991

UNIVERSITY OF ILLINOIS

DANGER or WARNING. When spraying overhead, wear shirt sleeves inside gloves. At all other times, wear shirt sleeves on the outside to prevent chemicals from entering gloves at the cuff.

Never wear cotton or leather gloves—they can absorb the chemical and give constant exposure to your skin.

Check gloves carefully for leaks before wearing them. Fill them with water and squeeze. If leaks appear, throw them out. Before removing gloves, wash them with detergent and water to prevent contaminating your hands.

When handling or applying chemicals, wear unlined, lightweight rubber boots that cover your ankles. Wear your trouser legs on the outside to prevent pesticides from draining down into the boots. Wash them daily and dry thoroughly inside and out.

Several types of head gear such as waterproof rain hats, washable wide-brimmed hard hats, or caps can be used to protect the hair and skin on your head. Waterproof or repellent parkas can protect both your head and neck. Avoid headgear with cloth or leather sweatbands or cotton or felt hats because they can absorb chemicals.

Wear a respirator when using organophosphates such as TEPP, parathion, Guthion, Di-Syston, Thimet, or Phosdrin or carbamates such as Furadan or Temik when specified on the label. Specific cartridges and canisters protect against specific chemical vapors. Be sure to choose the type made to protect you from pesticides you will use. Be sure the respirator fits your face well to ensure a good seal. Long sideburns, beard, or glasses may prevent a good seal.

From Crop Protection Management, May 1990.

Genetic Engineering Hits Pest Control Bull's Eye

Genetically engineered plants may help farmers use fewer pesticides. "We need innovative, environmentally sound, improved methods of pest control," said Larry Murdock, Purdue University entomology professor. "For certain problems, insect resistance put into crop plants through genetic engineering will hit the bull's eye." Murdock recently spoke at Purdue's Agricultural Forum.

"Genetic engineering is very surgical, it puts the insect-controlling substances where they are needed in the plant, not in the soil, air, or water," he said. The environment doesn't become littered with insect control agents.

Often, resistance genes produce proteins that work against the targeted insect. These proteins are natural, biodegradable substances that humans have been exposed to in their evolutionary past, Murdock said. The resistance genes also are target specific, unlike most classical insecticides, said Murdock. For example, a

resistance gene may work only against Mexican bean beetles, while its chemical counterpart would indiscriminately kill beneficial and harmful insects. With genetic engineering, scientists put the resistance genes into the seed of a crop plant. This makes it easy to use. The plant grows, expresses the resistance genes, and is protected. It also should make plant protection cost less, Murdock said.

Scientists move genes for physical or chemical insect resistance from microbes or other cells into single plant cells, said Peter Dunn, director of Purdue's agricultural biotechnology program. Before farmers can use the genetically changed crop plants, scientists must regenerate plants and seeds from the changed cells.

"Once the gene or genes are incorporated, we have to get the whole plants back, which can be difficult," said Randy Woodson, Purdue horticulture professor. Plant regeneration has been easy in tobacco, potato, and petunia plants, but hard in corn, soybeans, rice, and many other plants.

Genetically engineered insect resistance does have limitations, Murdock said. Insects will eventually develop resistance to the genes that stop them, just as they develop resistance to classical insecticides. However, insect resistance can be slowed by carefully using genetically engineered plants, just as farmers are learning to rotate and mix pesticides for maximum benefits.

Another limitation is the lack of insect resistance sources. Researchers have found only a few useful genes. "Our supply is small," Murdock said. "We need to search out or create new genes for insect resistance."

Scientists also need to responsibly address the fact that some genes or gene products can pose a hazard, Murdock said. However, most should not be dangerous because they have existed for a long time and are present already in our food, he said.

From Farm Week, February 11, 1991.

Herbicide Enhancer Released

Precision Laboratories, Inc., a leader in growth technology, announces the release of Pen-A-Trate II, a superior-grade, non-ionic spreader/activator, developed to enhance the performance of herbicides. Pen-A-Trate II is a new generation, higher level of surfactant technology, designed to answer today's more sophisticated low-rate herbicide requirements, while providing the added benefit of worker safety, according to the company.

Extensive field testing has proven that Pen-A-Trate II can significantly affect the overall performance of low-rate herbicides. It improves wetting, spreading, and weatherability and produces superior results over a wide range of temperatures and conditions.

Pen-A-Trate II is highly concentrated and low foaming. It is compatible with all pesticides and works well in all types of hard and soft water, including water

with high mineral content. Because it contains no alcohol and is nonflammable, Pen-A-Trate II also provides an essential added margin of safety for workers.

It is effective in nitrogen solutions and works equally well in low-use solution. Pen-A-Trate II is packaged in 1-gallon containers, 55-gallon drums, and 275-gallon mini-bulks. For more information, phone 1-800-323-6280.

From Illinois AgriNews, February 15, 1991.

Residue Testing Proves Produce Is Safe

Extensive monitoring on several levels shows concerns about pesticide residues are unfounded. The produce industry has science on its side when it comes to proving that the food supply is safe. Testing by the U.S. Food and Drug Administration (FDA), for example, shows that in 1989 no detectable pesticide residues were found in most of more than 18,000 samples that were analyzed. The testing methods are so sophisticated that residues can be detected at levels as low as 0.01 part per million (ppm).

Vegetables and fruits accounted for 75 percent of the monitored food items. No pesticide residues were found in more than 65 percent of the samples, and less than 1 percent had residues above EPA legal tolerance levels. These findings are consistent with results reported the past several years.

In addition to the general program, FDA carries out selective surveys each year to track the occurrence of particular pesticides or groups of chemically related pesticides in various crops. In 1989, the targeted monitoring focused on aldicarb, benomyl, daminozide, and EBDC/ETU.

The aldicarb program, for instance, focused on potatoes, peppers, watermelon, cantaloupe, pineapples, and bananas. In the 499 domestic and 770 imported samples which were tested, residues (well below tolerance) were found in only four samples.

Sometimes consumer groups raise concerns about the cumulative effect of even minute pesticide residues, especially in population groups such as children, who might be expected to consume large quantities of certain foods. Those concerns are again easily dispelled by scientific facts.

In addition to the pesticide regulatory monitoring program, FDA uses the Total Diet Study (TDS) to follow the dietary intake of pesticide residues for eight age/sex groups, ranging from infants to senior citizens. Foods are purchased from local supermarkets four times each year in three cities in each of four U.S. geographic regions. Each market basket contains 234 food items that have been selected, based on nationwide dietary surveys, to represent the diet of the U.S. population.

In 1989, results of this market basket study showed that pesticide residues actually consumed by the public are well below the standards established by the EPA and by both the United Nations Food and Agriculture Organization and the World Health Organization.

Pesticide residue testing is also done at the state level in a number of states. The California Department of Food and Agriculture (CDFA) has the most extensive program. The \$4.2 million CDFA residue testing program is part of California's \$40 million overall program to regulate pesticide use. CDFA residue testing encompasses a four-pronged approach.

In 1989, 9,403 samples were analyzed as part of the marketplace surveillance program. Tests showed there were no detectable pesticide residues in almost 78 percent of those samples. Residues within legal tolerance were found in about 21 percent, and illegal residues were found in less than 1 percent.

The CDFA priority pesticide program concentrates on monitoring pesticides of special health interest. In 1989, 36 pesticides were targeted and only crops known to have been treated with those pesticides were sampled. Of 2,165 samples analyzed, 90 percent contained no detectable residues. Residues within tolerance were detected in 9.9 percent.

Similarly, more than 90 percent of the samples of produce destined for processing showed no detectable residues, while the remainder showed residues within tolerance. The preharvest monitoring program analyzed more than 2,000 samples, with less than 1 percent showing illegal residues.

As if all this testing were not enough, some growers have taken a further step to help reassure their customers that their produce is indeed safe. Private testing laboratories seemed to spring up overnight when the Alar crisis hit, and some large companies, including Sun World International, established their own in-house testing laboratories.

The Sun World lab, touted as the first grower-operated residue testing lab in the United States will test 2,000 representative samples per year from the company's nearly 100 fresh produce items.

Jean D. Aylesworth, American Vegetable Grower, Winter 1991.

Produce Stars in Fight Against Cancer

A diet rich in vegetables, fruits, and grains may reduce chances of developing colon cancer by 40 percent. This was the conclusion of a study published April 18 in the *Journal of the National Cancer Institute*.

The study's timing couldn't have been better. The next day was the American Cancer Society's kickoff for the Great American Food Fight Against Cancer. This nationwide effort, similar in scope to the society's Great American Smoke-Out, told people that healthy

eating may reduce the risk of many cancers. Eating more fruits and vegetables is a big part of the society's message.

The study supports the message. Before making conclusions, researchers from the Fox Chase Cancer Center in Philadelphia and the Cancer Institute reviewed data from 37 previously published studies involving 10,000 people. The studies examined the link between dietary fiber and colon cancer.

Colon cancer is second only to lung cancer in the number of American cancer deaths per year. As Susan FitzGerald noted in *The Philadelphia Inquirer*, the Cancer Society estimates 155,000 new cases of colon cancer will be diagnosed this year and nearly 61,000 people will die from the disease.

Fortunately, there is a way to reduce these statistics. "People who have a high intake of grains, cereals, vegetables, and fruit could reduce their colon cancer risk maybe as much as 40 percent, compared to people with a low intake of those foods," said Bruce Trock, a cancer epidemiologist at Fox Chase.

Unfortunately, people do not eat as many fruits and vegetables as they should. Five servings of produce a day have been recommended by the National Research Council of the National Academy of Science. The average American only eats about half that, according to studies by the USDA and the California Department of Health.

Good-eating Guidelines

Increasing American fruit and vegetable consumption is a goal of the Great American Food Fight Against Cancer. Fresh produce fits perfectly with five of the seven American Cancer Society's nutrition guidelines:

- "Avoid obesity." Fruits and vegetables generally are low in calories and high in fiber, which helps people feel full faster.
- "Cut down on total fat intake." Produce generally is low in fat. When more fruits and vegetables are added to the diet, fat intake usually goes down.
- "Eat more high-fiber foods such as whole-grain cereals, fruits, and vegetables."
- "Include foods rich in vitamins A and C in your daily diet." Cabbage family vegetables, like broccoli, cauliflower, cabbage, and brussels sprouts, contain a protective factor that may reduce risk of certain cancer.
- "Eat moderately of salt-cured, smoked, and nitrite-cured foods."
- "If you drink, keep alcohol consumption moderate."

The Packer, May 12, 1990.

FDA Proposes Mandatory Nutritional Labeling

Consumers will likely see changes in food labels that may clarify just what it is they are eating. The Federal Drug Administration has completed a proposal for mandatory nutritional labeling for most products in America's grocery stores as part of a comprehensive plan to reform the nation's food labeling policy. Additional FDA proposals would require that food labels inform consumers about fat, cholesterol and fiber content; would standardize serving sizes; define the cholesterol claims that can be placed on food labels; and revise the U.S. Recommended Daily Allowances for daily vitamin and mineral intake.

"I strongly believe that American consumers should have full access to information that will help them make informed choices about the food they eat," said U.S. Department of Health and Human Services Secretary Louis Sullivan.

FDA issued the new proposal after an exhaustive review of current food labeling policies and gathering of public opinion. The public consensus overwhelmingly indicated that a comprehensive reform of food labeling is needed, Sullivan said.

Current regulations on food product labeling mandate that only foods advertising a nutritional claim, such as low fat or low calories or foods with added nutrients must have a nutritional label to back those claims. About 60 percent of food products on the market carry nutritional labels, most of which are voluntary, according to University of Illinois Extension food specialist Dawn Hentges.

"People are confused and frightened by the long list of chemical names on food labels," Hentges said. "The new proposal is attempting to eliminate some of the confusion customers feel when they try to read food ingredients."

Current regulations make it easy for food processors to take advantage of public ignorance of chemical names. For example, a manufacturer could hide the fact that a product contains almost 90 percent sugar with a variety of chemical names such as dextrose and sucrose.

In the coming months, FDA plans to issue a new proposal requiring manufacturers to list the number of calories from fat, the amount of saturated fatty acids, the amount of cholesterol, and the amount of total dietary fiber in the product. Advertising claims would carry less weight, since consumers would be able to read the label and determine if the product is as "healthy" as the manufacturer claims it to be.

"Under the proposal, manufacturers can make health claims for their products, but they can't say that a product can cure, prevent, or treat a disease," Hentges said. FDA would also define terms such as "reduced cholesterol", "low cholesterol," and "light."

Illinois AgriNews, August 24, 1990.

European Mite OK'd by USDA for Mighty Big Job in United States

A mite from Mediterranean Europe, now adapting to its new home in the United States, could give farmers relief from a weed that binds crop plants in a deadly embrace, according to a U.S. Department of Agriculture (ARS) scientist.

"This small mite has been given the OK for a big job—controlling one of the worst weeds strangling corn, wheat, and other U.S. crops," said Sara S. Rosenthal, an entomologist with the USDA's Agricultural Research Service. The weed, a vine known as field bindweed, is an "out-of-control morning glory," she said. "It can smother crop plants by winding tightly around their stems and by stealing their food and water, with roots that may reach 30 feet deep. It also serves as a reservoir for crop insects and diseases."

The mite, *Aceria malherbae*, is only 1/75th of an inch long, said Rosenthal at ARS' Rangeland Weeds Laboratory, Bozeman, Montana. Earlier, she proved that it gobbles stems and leaves only of field bindweed and closely related plants, none of which is a crop plant.

Rosenthal's colleagues, ARS entomologists Culver J. Deloach, Jr. and Paul E. Boldt at the Grassland Protection Research Unit, Temple, Texas, released thousands of the mites in Northern Texas and New Jersey in the spring of 1989. The mites survived winter and reproduced at both sites. Scientists will continue to measure how well they thrive and control bindweed.

According to Rosenthal, field bindweed—the 15th worst weed in the United States—is most serious in the Midwest and West, where corn and wheat are particularly hard hit. "This weed is difficult and costly to control with herbicides and cultivation, and continues to spread despite newer herbicides used against it and other perennials weeds," said Rosenthal.

Scientists at the agency's Biological Control of Weeds Laboratory near Rome, Italy, collected the mites and sent them to Boldt and Deloach. The Rome laboratory specializes in locating bugs to prey on weeds that—like bindweed—are native to Europe.

Throughout the past century, many weeds in the United States snuck into the United States by hitchhiking inside shipments of crop seeds, but quarantines and inspections minimize that risk today. Field bindweed invaded the United States in the late 1800s.

The mite joins *Tyta luctuosa*, a moth imported from the Rome lab to eat bindweed leaves and stems. The summer of 1990 marked the third attempt at getting *Tyta* established, Deloach noted. Previous releases failed because the trial areas were too hot or too dry. Last summer, scientists released the moth in locations with more favorable climates—Southwestern Arkansas and Central Missouri.

ARS entomologists are continuing their search for other exotic mites and insects. Often, they said, controlling a weed with its natural enemies requires a com-

bination of hungry bugs that prefer dining on different parts of the same pest plant. The insects eventually sap enough energy from the weed to debilitate or kill it.

Illinois AgriNews, February 22, 1991.

Leaf Blight Problems Possible

Wet weather early in the 1991 growing season could cause some serious leaf blight problems for corn growers, a University of Illinois plant pathologist predicted last month. The buildup of fungal leaf blight diseases late in the 1990 growing season allows for fairly high levels of inoculum to go into overwintering, Don White told participants in the Illinois Agricultural Pesticides Conference.

"Historically, leaf blight diseases across Illinois are not a problem on corn unless you have two years with wet weather back to back," White said. He explained that inoculum will increase during the first wet year; and if a second wet year occurs, the disease will occur early in the growing season and cause severe damage.

"What we have this year is a buildup of a number of leaf blights that occurred late in the growing season, so inoculant will be present next year and could present a potential problem," White said. The inoculum should be fairly successful in overwintering due to the amount of reduced tillage used in Illinois.

Northern corn leaf spot will be serious in the northern half of the state if wet weather occurs early in the growing season, according to White. Usually, hybrids will not suffer a yield loss unless 15 percent or more of the leaf area is blighted at pollination.

In addition, gray leaf spot may be a problem in many parts of the state if there is high humidity and early rain. "With gray leaf spot, we do not have high-yielding, widely-used hybrids with good resistance," White said. "The disease will be most severe in areas where corn follows corn and reduced tillage is used."

Northern corn leaf blight could be damaging, too, especially since many of the widely-used, high-yielding hybrids do not have high levels of resistance. "With the increased use of reduced tillage in the last 15 years, fungal blights will likely become more important," he said. "General concerns by the public about food safety and the ability to detect very small amounts of mycotoxins will result in a new emphasis on the solutions to problems related to ear rots and grain storage."

Illinois AgriNews, January 18, 1991

Seed Treatments Target Soilborne Diseases

A new technique being evaluated in the battle against soilborne diseases uses biological control agents in conjunction with commercial seed coating or priming processes. The seed treatment serves primarily as a de-

livery system for beneficial species of fungi (*Trichoderma*, *Penicillium*, *Gliocladium*, etc.) or bacteria (*Pseudomonas*, *Bacillus*, *Streptomyces*, etc.). These reduce diseases caused by such important soilborne plant pathogens as *Pythium*, *Rhizoctonia*, and *Fusarium*.

The presence of biocontrol agents on seeds and, less commonly, in the developing root zones of seedlings has been shown to increase the survival rate of several direct-seeded vegetable crops. Beneficial microorganisms suppress pathogens by competing with them for nutrients, producing inhibitory compounds, directly parasitizing them (hyper-parasitism), or through various combinations of these three mechanisms. Crops which have benefitted from biological seed treatments include asparagus, cucumber, pepper, sweet corn, tomato, and watercress.

Biocontrol delivery systems tested thus far range from older clay-based pelletization methods to the recent use of organic materials (wood pulp and coal substances) and include priming techniques such as film-binding and solid matrix priming (SMP). Bulk coatings are generally designed to facilitate seeding by standardizing seed size and increasing water-holding capacity.

Priming techniques provide additional benefits by hastening seed germination and increasing emergence potential. Increasing the rapidity and uniformity of seedling emergence lessens the time the seed is in the soil, thereby reducing the opportunity of contacting soilborne pathogens. Priming can employ plant hormones such as gibberellic acid and cytokinins, which also enhance the growth of young seedlings.

Recently, two known biocontrol agents, *Enterobacter cloacae*, a fluorescent *Pseudomonas* sp., and *Azospirillum* sp., a previously untested nitrogen-fixing bacterium, and a commercial fungicide (Ridomil) were applied as SMP seed treatments on pepper. They were tested at the Southwest Florida Research and Education Center in Immokalee against damping-off and root rot caused by *Phytophthora capsici*.

Although it is still too early to tell if any of the biocontrols used can significantly control *P. capsici*, some interesting horticultural results were observed. No adverse effects were noted in pepper germination, emergence, leaf area (at 4 weeks), shoot fresh weight, shoot and root dry weight, or plant height as a result of the biocontrol treatments in comparison to untreated seeds. In fact, seeds treated with *Azospirillum* and Ridomil produced transplants with greater total dry weight than the control. These results could translate into more vigorous transplants with a higher survival rate.

Similar research is being conducted at many agricultural universities around the world, but this is not a wholly academic pursuit. One company, Kamterter, in Lincoln, Nebraska, patented the SMP system. It currently offers vegetable seed primed with biocontrol agents on a trial basis. Kamterter has already had research experience with tomato, pepper, sweet corn, and celery.

While it has been demonstrated that some biological

seed treatments can match the effectiveness of certain registered fungicides, complete disease control has not been achieved. In general, biological seed treatments have been most effective in preventing seed decay and damping-off. Most biocontrol agents fail to become established in growing root zones in sufficient numbers for disease suppression due to various reasons including unfavorable soil temperature, pH, and moisture.

C.S. Vavrina and R.J. McGovern, American Vegetable Grower, December 1990.

Fungus May Halt Potato Leafhopper Crop Damage

The potato leafhopper, nemesis of crops from the Northeast through the Corn Belt, may some day be halted in its destructive wanderings by a fungus that's logged quite a few miles of its own, according to U.S. Department of Agriculture scientists.

Imported from Europe and South America, the fungus *Zoophthora radicans* can kill a leafhopper in three to four days, said entomologist Raymond I. Carruthers of U.S.D.A.'s Agricultural Research Service (ARS). After the leafhopper dies, the fungus spews spores that fall onto other leafhoppers and also stick to leaf surfaces where the pests might cross.

As a natural alternative to chemical pesticides, the fungus could mean significant savings for farmers on control measures to combat the leafhopper, Carruthers noted. "Leafhoppers attack more than 200 crops, including potatoes and alfalfa," he said. "Farmers in the Northeast and Midwest probably apply more insecticides to control potato leafhoppers than any other pest in alfalfa." "We can grow this pathogen relatively easily in liquid medium without having the insect at all," Carruthers added. "We simply collect it, dry it, grind it up, bag it, and refrigerate it so it lasts longer. When you want to use it, you just take it out, add water, and it will produce spores that infect the insect."

Control of the potato leafhopper has been complicated in the past by the pest's migratory habits, explained Alan J. Sawyer, an ARS ecologist. "It normally winters no farther north than Louisiana, then comes up to attack the crops," he said.

Illinois AgriNews, January 4, 1991.

Growers Control Colorado Potato Beetles with Insecticide

The Colorado potato beetle has developed resistance to most insecticides in many areas of the country where growers have relied primarily on chemical and non-chemical practices to battle the insect, says University of Wisconsin-Madison entomologist Jeff Wyman. "Wisconsin still has Colorado potato beetle populations

relatively susceptible to insecticides," Dr. Wyman says. "This has occurred because growers are mindful of problems that may develop when only insecticides are used to control the insect."

Left uncontrolled, the Colorado potato beetle can devastate potato fields. In the past, Wisconsin growers controlled the insect primarily with insecticides, the most effective being Aldicarb. However, Aldicarb has been detected in a number of Wisconsin wells and was banned here in 1988. This year, the manufacturer has removed Aldicarb from use on potatoes nationwide.

Like many insects, the Colorado potato beetle goes through a number of larval stages before becoming an adult. UW-Madison researchers have found that the insect inflicts the most damage beginning at the third larval growth stage. Growers can determine when the insect reaches this stage by scouting fields to find when egg laying begins and by monitoring daily temperatures. Growers then apply an insecticide only when the Colorado potato beetle reaches the third larval stage and make a second application to kill any late-developing larvae. Previously, growers made up to six insecticide applications during the growing season. "We've found that those two applications, if timed correctly, are all we need to control Colorado potato beetles," Dr. Wyman notes. Growers can further reduce the possibility of insects developing resistance by alternating insecticides, he adds.

In addition, *Bacillus thuringiensis* (*Bt*), a natural insecticide made from a strain of bacteria, shows promise in killing Colorado beetle larvae. *Bt* products work only on specific insects, so they are safe to beneficial insects, wildlife, and humans. Because sunlight breaks down the *Bt* insecticide rapidly, researchers are studying ways to make it persist longer on the crop. They also want to increase *Bt*'s effectiveness by stimulating the Colorado potato beetle to eat more of the insecticide. Dr. Wyman says the Colorado potato beetles are unlikely to develop resistance to *Bt* insecticide. Other strains of *Bt* are effective in controlling caterpillars such as cabbage worms.

UW-Madison researchers are devising several other strategies to control Colorado potato beetles with fewer chemicals. They have found that the insect overwinters close to potato fields in plant residue or mulch and moves to new fields the following spring by walking. In the future, growers may be able to plant a trap crop outside of new potato fields and kill the insect in the trap crop before it migrates to the fields and lays eggs.

Growers could also expose Colorado potato beetles to Wisconsin's bitter winter by removing the mulch next to the fields, an approach currently being studied by UW-Madison soil scientist Sam Kung. Because the natural mulch helps to prevent soil erosion, growers would set down an artificial mulch to entice the insects.

While these practices won't eliminate the insect entirely, says Dr. Wyman, they could reduce beetle numbers by as much as 50 percent. In several areas of the state, Dr. Wyman and other UW-Madison researchers

are working with growers interested in producing organic potatoes. Dr. Wyman says growers could produce organic potatoes by growing early maturing potatoes to avoid disease and insect problems and by using cultural control on weeds.

The Great Lakes Vegetable Growers News, June 1990

Potato Tubers Develop Their Own Roots to Take in Water and Nutrients

Potato tubers are underground plants that grow their own roots to take up water and certain nutrients—which may enable potato growers to make more efficient use of fertilizers, according to University of Wisconsin-Madison horticulturist Jiwan Palta. Previously, scientists believed that the potato plant's main roots provided all available water and nutrients to the leaves, which in turn fed the tubers. Because leaves dry out so rapidly in the sun, they require enormous amounts of water each day, Mr. Palta notes. In contrast, tubers grow in a relatively moist soil environment, so they cannot compete with leaves for available water. Tubers compensate by growing their own roots, which Mr. Palta found by gently digging developing tubers out of sandy soil. The roots are very difficult to see, and they break off easily when the potato is harvested, he notes.

Mr. Palta then speculated that these roots enabled tubers to receive water and water-soluble nutrients such as calcium from the soil. In his research, he found that applying high levels of calcium fertilizer near the main plant roots did not increase calcium levels in tubers. However, calcium fertilizer applied near the tubers during their development tripled the amount of calcium in the tubers. Mr. Palta noted similar results after tracking water-soluble dye through the potato plant.

Studies indicate a link between high levels of calcium in tubers and reduced risk of soft rot, internal brown spots, and shoot tip necrosis on young stems. Soft rot can cause severe economic damage to potatoes in storage each year. High calcium levels strengthen the cell wall of potatoes, providing tubers with a defense mechanism to slow down bacterial growth, Mr. Palta says. Most of Wisconsin's potatoes are grown on sandy soils, which provide enough calcium for plant growth, but usually not enough for tubers to help them resist diseases. By applying calcium fertilizer to the area where potato tubers develop, growers can increase disease resistance in tubers, Mr. Palta notes.

Currently, growers complete all their fertilizer applications by the time potatoes are hilled. The tubers are only starting to form at this time, says Mr. Palta. If growers irrigate continuously throughout the growing season, much of the nutrients would leach from the hills before the tubers begin to enlarge, he adds. Mr. Palta says the key is to place calcium as close as

possible to the potato tubers in the hills after the tubers start to develop. Putting the calcium in water soluble form allows faster uptake by tubers. Mr. Palta has tested three applications of soluble calcium through the irrigation system, one at the time of hilling and then three weeks and six weeks later.

"Results to date suggest that we can enhance the calcium concentrations of potato tubers tremendously," Mr. Palta says. Split applications can also reduce the chance of fertilizer leaching into the groundwater, he adds. Higher calcium levels may also improve chipping and bulking quality in tubers, two qualities processors look for in potatoes. In addition, studies suggest that applications of nitrogen with calcium can increase tuber yields in drought years such as 1988, says Mr. Palta.

Potato growers may be able to improve the efficiency of other fertilizer applications by adding nutrients near the tuber roots rather than the plant roots, Mr. Palta notes. "In soils like we have in Wisconsin, it is very important that the area of the hill where the potatoes are growing has adequate nutrition," he stresses.

From The Great Lakes Vegetable Growers News, November 1990.

Farm Stands Go Upscale

Those quaint roadside fruit and vegetable stands are going upscale as they target baby boomers willing to pay for an experience they can't find in supermarkets, a professor says. "We're not really selling food," Kelso Wessel, an associate professor of agricultural economics at Ohio State University, told a session of the Great Lakes Vegetable Growers Convention. "We've all got more than enough food," he said. "What we're selling is an experience that you can't get in the supermarket."

Wessel calls roadside marketing "entertainment farming" because its primary customers are families looking for wholesome entertainment. Farmers aren't just setting up shacks with a couple of barrels of tomatoes anymore. They're featuring organic and other varieties of produce and adding petting zoos, "pick-your-own" orchards, hay-rides, and even small restaurants. Some offer seasonal events, craft shows, agricultural education for children, and farm tours.

Wessel said "entertainment farming" has seen tremendous growth over the past several years, with many farm families turning to it for extra income during tough times in the early 1980s. In a slide show that showed a graying man in front of his Volvo, Wessel said baby boomers are willing to pay more for produce if it included "escaping the doldrums of the 8-to-5 job." "It's a lot cheaper to drive an hour or two to the country and spend the afternoon with the family at a farm than it is to spend the day at King's Island amusement park," Wessel said.

The Sunday Journal, Kankakee, February 3, 1991.

Triploid ("Seedless") Watermelons Show Promise

Most youngsters love watermelon, not just for the taste but also for the chance to chase each other around the yard in seed-spitting contests. However, most of us, by the time we have reached the age of twelve or so, have come up with better ways to get into trouble. We would prefer our watermelons without seeds if given the choice. Varieties that produce few or no seeds have been available for more than 40 years, but because of seed production and yield problems these types have only recently had an impact on U.S. markets.

The first "seedless" varieties were released in 1939 by Japanese breeders, and the U.S. Vegetable Breeding Laboratory at Charleston, South Carolina, began working with them in 1955 (see *American Vegetable Grower*, April 1957). Seed companies and growers in the United States experimented with these hybrids over the years, but didn't have much success in overcoming the yield and production problems.

Recently, however, the development of substantially improved varieties, and intensive marketing campaigns by Sun World and several seed companies have resulted in the expansion of "seedless" watermelon sales from virtually nothing in 1987 to about 5 percent of the market in 1990. Some project that these new types may capture as much as 50 percent of total sales in the near future.

Producing seed of a "seedless" variety takes some rather tricky breeding. All of the "seedless" watermelons are triploids, meaning they contain three sets of chromosomes (genetic information), rather than two sets like normal diploid varieties. Without going into all the details, the most difficult aspect of seed production is obtaining and maintaining a tetraploid parent line (with four chromosomes) which is crossed with a normal variety to produce the desired triploid. The bottom line for growers is that the process is expensive, so seed costs are higher.

With higher seed costs, and some special production practices (see below), what are the advantages of growing these new types, other than the obvious one of not having to spit out seeds? The most important is that triploids have substantially longer shelf life and better shipping quality than traditional varieties. This has been recognized for many years, and is the primary reason some predict that triploids will eventually have a major slice of the market. The explanation for this advantage is that these varieties tend to have a slightly tougher rind, and there are few seeds to provide places for overripening and mealy texture. Many of the triploids also are inherently sweeter than standards, which tends to extend their shelf life and eating quality.

Another significant advantage of triploids is that many appear to have an extra degree of field tolerance to disease. Some of the earliest cultivars did not have resistance to specific wilt diseases, but this is not the

case with most of the newly released varieties.

The disadvantages of triploids are also substantial, and must be carefully considered by a grower before experimenting with these new types. Although seed production methods have improved, seed costs are still high, and germination is frequently a problem, particularly under cool soil temperatures.

Below are some production guidelines for triploid varieties:

- First, explore the market potential in your area, keeping in mind that costs of production will be considerably higher.
- At planting, soil temperatures should be above 68 degrees F. Over-seeding may be needed to compensate for lower germination. The use of transplants rather than direct seeding is recommended for many areas.
- Although triploids are usually quite vigorous once established, during early seedling development they require extra care, and irrigation is more critical. The use of plastic or fabric row covers will also help ensure good stands under cool conditions.
- A normal pollinator variety is required for fruit production because triploids are self-infertile. The normal variety used as the pollinator should be planted at the ratio of one row of normal to two rows of triploid. The pollinator should be one that produces fruit easily distinguishable from the triploid, so that there is no confusion at harvest. Your seed salesperson should be able to provide advice on this aspect of production.
- Be cautious in marketing triploid watermelons as "seedless." Most of the fruit of most varieties will contain only inconspicuous, edible, empty seed hulls. However, environmental stress conditions can cause the development of some empty seed hulls that are hard and black. The first fruit in the crown set also have a tendency to produce more hard seed hulls. Some California producers, as a precaution to avoid litigation, do not market their crown set fruit as "seedless."

This past season a triploid watermelon variety trial was conducted in eastern New York. Transplants were produced in a Cornell University greenhouse and then planted to a commercial field in early June. Fabric row covers were applied at planting and removed about four weeks later. The first ripe fruit were observed in mid-August. Germination in the greenhouse was, in general, similar to or only slightly poorer than what would be expected of a normal diploid, although one of the nine varieties tested had a severe germination problem.

Yields were good and average fruit size ranged from 11 to 17 pounds. Fruit quality varied, but several of the new numbered lines examined had exceptionally good flavor, sweetness, and texture. The detailed yield

and quality evaluation, conducted by Dale Riggs, Extension vegetable specialist for the area, will be available this winter.

Results from trials in New York and other areas have been encouraging. Considering the potential shift in the market that these new triploid hybrids may bring about, growers might consider some small-scale trials of their own. Several seed companies such as Abbott and Cobb, Petoseed, Northrup King, Asgrow, Sakata, and others have released triploids. Keep your eye on these varieties in the future.

*David M. Wolfe, American Vegetable Grower,
December 1990.*

Cover Crop Conference Planned

Use of agricultural cover crops for soil erosion control and water quality improvement will be discussed at a conference planned for April 9-11, 1991, in Jackson, Tennessee. "Cover Crops for Clean Water" is being sponsored by the Soil and Water Conservation Society in cooperation with a number of agriculture conservation agencies and organizations. The conference will take place at the West Tennessee Experiment Station.

Cover crops, which are used in many agricultural production systems to protect soil and conserve water between cropping cycles, have implications, both positive and negative, for water quality management, according to William Hargrove, a University of Georgia agronomist who is program chairman for the conference. Our goal during the conference will be to offer participants the most up-to-date ideas on how cover crops can be used effectively to achieve water quality management goals," Hargrove said.

Specific topics to be dealt with in the program include: cover crops' effects on soil erosion by both sand and water; influence of cover crops on the runoff and infiltration of precipitation; how cover crops affect nutrient cycles; pest problems in cover crops; economic uses of cover crops; and development of suitable cover crop germ plasm.

More information about the conference can be obtained from the Soil and Water Conservation Society at 7515 Northeast Ankeny Road, Ankeny, Iowa 50021; phone (515) 289-2331. The society is a non-profit international organization dedicated to promoting the science and art of good land and water use.

Illinois AgriNews, July 20, 1990.

The Herb Growing and Marketing Network

Effective October 1, 1990, herb businesses and persons interested in the herb industry will have a new information source. *The Herbal Connection* is the publication of the Herb Growing and Marketing Network,

an information service. Edited by Maureen Buehrle, the former Executive Director of the International Herb Growers and Marketers Association, *The Herbal Connection* will provide news on the latest trends in herbs for the culinary, decorative, and medicinal markets. The 36-page bimonthly publication will have articles on production, pricing, marketing, new products and uses, as well as herb book reviews and a calendar of herb events.

Though geared to the small and medium-size herb business, herbal enthusiasts will find numerous suggestions on helping their hobby pay for itself. Larger firms will benefit by taking advantage of the information retrieval service as well. In January 1991, the first annual issue of the herb business resource directory will be released. It will include descriptive listings of over 1,000 herb-related firms as well as listings by product category and geographical area.

The total fee for the complete service is \$40 per year. That includes a subscription to *The Herbal Connection*, the annual issue of the resource guide, and access by mail or phone to the "Herbal Help Line." For a sample copy of the newsletter, send \$3 to: The Herbal Connection, 3343 Nolt Road, Lancaster, Pennsylvania 17601. *Contact Person:* Maureen Buehrle (address same as above), phone (717) 898-3017.

From Vegetables and Dollars, University of Kentucky, December 1990.

Andrea Cooper's Spicy Salsa

- 16 pounds tomatoes, peeled and cut into chunks (about 24 cups)
- 10-12 large onions, chopped (about 18 cups)
- 1 cup hot peppers, chopped
- 5 (or more to taste) cloves garlic, finely chopped
- 4 cups green bell peppers, chopped
- 2 tablespoons honey or sugar
- 2 cups cider vinegar

1. Combine the ingredients in a large kettle (16-24 quarts), bring to a boil, reduce heat, cover, and simmer for 30 minutes, stirring at least once.

2. Using a slotted spoon, scoop the salsa into sterilized pint or quart jars, pack down, and run a rubber spatula (or chopstick) around the inside edge to eliminate any air bubbles.

3. Seal and process in a hot-water bath: 35 minutes for pints, 45 minutes for quarts.

Yield: 10 quarts of salsa (2 quarts of liquid for hot sauce)

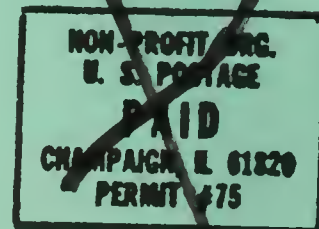
Per one-quarter-cup serving (estimated): 14 calories, 0.5 g protein, 3 g carbohydrate, 0.13 g fat, 0 mg cholesterol, 4 mg sodium, 21 percent U.S. RDA vitamin C, 11 percent U.S. RDA vitamin A.

From Organic Gardening, July/August 1990.

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801



Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

105
2



Illinois Vegetable Farmer's Letter

COOPERATIVE EXTENSION SERVICE

COLLEGE OF AGRICULTURE
UNIVERSITY OF ILLINOIS
AT URBANA—CHAMPAIGN

Vol. 9, No.4

The end of the year is upon us, and even as we assess the past season we must begin to plan again. The Illinois Fruit, Vegetable, and Irrigation Convention, January 15-18, 1990, in Springfield, will offer a variety of opportunities regarding the coming year. Representatives at the trade show will be able to help you plan and make purchases of seed, equipment, and supplies. Educational sessions and workshops may help you gain information that will allow you to develop ideas or avoid future problems. Interaction

with other growers can initiate mutually beneficial relationships. It is a concentrated time of activity, available to you. We hope to see you there.

Pesticide Training and Certification Workshop

A pesticide training and certification workshop will be held Thursday morning and afternoon, January 18, 1990 at the Illinois Fruit, Vegetable, Herb, and Irrigation Convention in Springfield. This is an opportunity for fruit and vegetable growers to obtain or renew their pesticide licenses. The Cooperative Extension Service of the University of Illinois writes the study guides and teaches the training sessions. The workshop will begin at 8:00 a.m. with General Standards Training. At 11:00 a.m. Vegetable Category Training will begin, with testing by the Illinois Department of Agriculture at 2:30 p.m.

To obtain advance registration materials, contact Phil Nixon, University of Illinois, 172 Natural Resources Building, 607 East Peabody Drive, Champaign, IL 61820, (217) 333- 6650. A \$10 registration fee is required. You can also register at the convention registration booth.

The following manuals are not included in the registration fee, but are recommended for study. They can be ordered in advance:

December 1989

General Standards Manual	\$2.50
Fruit Crops Pest Control	\$4.00
Vegetable Pest Control	\$4.00

Make checks payable to the University of Illinois and send to: Office of Agricultural Entomology, 172 Natural Resources Building, 607 East Peabody Drive, Champaign, IL 61820.

Market Master Workshop

A Market Master Workshop for fruit and vegetable growers will be held 10:00 a.m., January 16, at the Illinois Fruit, Vegetable, Herb, and Irrigation Convention. This one-and-a-half hour, hands-on workshop will address financial management and marketing techniques for fruit and vegetable growers. A workbook will be provided.

The workshop will be led by Mike Stanton, American Farm Bureau, Eureka, Illinois. Mike developed the Market Master Education Program for the Illinois Farm Bureau when he was associate director of the commodities division. The Market Master Program is currently offered in 12 states and in several Illinois community colleges.

A \$10 fee is required, and registration is limited to 30 participants. If any of the 30 slots remain open, you can register at the convention registration booth. Since space is limited, advance registration is recommended. Registration materials may be obtained by contacting Lee Rife, Illinois Department of Agriculture, State Fairgrounds, P.O. Box 19281, Springfield, IL 62794-9281, (217) 782-6675.

Unique Heirloom Program at Convention

On Wednesday, January 17, the Illinois Fruit, Vegetable, Herb, and Irrigation Convention will offer a novel presentation on heirloom crops and how they can be used as a marketing tool. The speakers for this session are first rate, and at the forefront of the preservation effort of crop varieties threatened with extinction.

Kent Whealy, founder of the Seed Savers' Exchange (SSE), has been described by *USA Weekend* as a "hero

AGRICULTURE LIBRARY

DEC 29 1989

next-door" for his efforts to save over 6,000 seed varieties (mostly vegetables) from extinction. Kent and his wife Diane founded SSE in 1975. During the past 15 years, more than 2,200 different members have distributed over 400,000 samples of seeds that are not commercially available and often on the verge of extinction.

He is also developing a conference center and campground near Decorah, Iowa, called Heritage Farm. This unique educational center will maintain and display historic orchards containing 500 to 600 19th century apple varieties, several breeds of rare poultry and livestock, and organic gardens where 1,200 endangered vegetables will be multiplied each summer.

Kent will set the stage for the heirloom crops presentation with his discussion of the SSE and Heritage Farm.

David Sliwa, who has a Ph.D. in entomology from Purdue, is helping Kent Whealy develop the historic orchards at Heritage Farm. His research at Heritage Farm has included work with hardy rootstocks to determine which varieties should be included in the collection. He will discuss his results at the convention.

David Cavagnaro, garden manager at Heritage Farm, will discuss how heirlooms fit into marketing niches. Cavagnaro, a nationally known freelance photographer, author, and naturalist, is also an accomplished gardener and orchardist with a deep love of flowers and years of experience with specialty produce growers and the restaurant trade in California.

Keith Crotz, known around the country for his American Botanist Booksellers business, will relate the literature of heirlooms. In addition to handling a specialized inventory of out-of-print, plant-related books, Keith has recently begun an effort to reprint rare but valuable reference materials. His initial success was a reprint of Fearing Burr's *Field and Garden Vegetables of America* first published in 1863.

Robert Becker of the New York Agriculture Experiment Station will conclude the program with a summary of a very creative heirloom program in New York state.

What a jam-packed half day this will be! These are some of the top people in heirloom work in the country, and we have them all together for you.

Pesticide Toxicity Misunderstood

With all the talk about pesticides and food this year, the word "toxic" has received a lot of attention, but when it comes to using pesticides, what does "toxic" really mean? According to Rick Weinzierl, University of Illinois Extension entomologist, defining toxicity is "an important first step in understanding what it means is to think about the short-term and long-term effects of pesticide exposure."

One common way to describe the short-term or acute effects of exposure to pesticides is with an LD₅₀ value.

LD₅₀ refers to the dose that will kill 50 percent of the test animals in a short-term trial. Typically, these tests are conducted on rats and mice. LD₅₀ values are expressed in milligrams of poison per kilogram of the test animal's body weight. This means that lower LD₅₀ values correspond to greater toxicity. Pesticide labels usually do not list LD₅₀ values, but they do indicate whether the chemical is highly toxic, moderately toxic, or slightly toxic.

The word *Danger* means that the pesticide is highly toxic and has an LD₅₀ value of 50 or less. *Warning* means that the chemical is moderately toxic and has an LD₅₀ value of 50 to 500. *Caution* means that the pesticide is slightly toxic and has an LD₅₀ value greater than 500. "Keep in mind that LD₅₀ values describe the toxicity of the product's active ingredient at full strength," Weinzierl said. "The active ingredient in many garden pesticides is diluted."

"Unfortunately," he added, "LD₅₀ values have been misunderstood and abused. Some people have tried to use LD₅₀ values to imply that exposure to a particular amount of a chemical is 'safe.' They claim that consumers can even eat or drink a certain amount of some pesticides (an amount lower than the LD₅₀ dose) and not be killed."

Weinzierl has two responses to such statements. First, he stresses that an LD₅₀ value simply indicates what dose of the chemical will kill 50 percent of the test animals. "It doesn't mean you will not suffer chemical burns, organ malfunctions, or other internal injuries." Second, he points out that these numbers estimate the dose that will kill the *average* test animal. Susceptibility to poisoning varies with each individual.

Considering these and other confounding details, what good are LD₅₀ values? Weinzierl said they are helpful in comparing the risks posed by different pesticides. As he puts it, "It makes good sense for everyone, including farmers, gardeners, and pest control companies, to choose the least toxic pesticide that effectively controls a pest."

A second aspect of toxicity—the long-term effects—revolve around another catchword—"carcinogenic." Carcinogens are substances that have the ability to cause cancer.

One way that researchers test chemicals for their potential to cause cancer is by giving them to laboratory animals at high doses for an extended period of time. Under low-dose exposures, it might take an incredible number of test rodents or many years of testing before researchers could observe the occurrence of cancer. With high doses, these limitations are at least partially avoided.

According to Weinzierl, some researchers say that using high doses is appropriate because the increase in dose does not cause the cancer. Higher doses simply allow researchers a greater chance to observe the occurrence of cancer. However, others argue that at high doses, certain chemicals will overwhelm the body's

ability to combat toxins. Therefore, they say, high doses can actually cause a cancer that might not have occurred at lower doses over a longer period of time.

"Both of these arguments are plausible," Weinzierl said. "I suspect that some compounds fit the first argument, which says the dose isn't the key in causing cancer. Other compounds probably fit the second, which says high doses enable the chemical to cause the cancer. Although our imperfect testing methods may result in certain compounds being falsely labeled as carcinogens, they still give us some evidence to question the safety of those compounds."

However, he has problems when people manipulate test results to bolster their arguments, either for or against pesticides. For example, assume an evaluation tentatively concludes that a certain chemical may cause cancer in anywhere from 1 in 10,000,000 humans to 1 in 10,000 humans. In a case like this, those promoting pesticides might mention only the more optimistic figure of 1 in 10,000,000. Those attacking pesticides, meanwhile, might mention only the more negative figure of 1 in 10,000.

"Rodent tests give us some useful information, but they almost never provide a basis for making definite and sensational claims about likely cancer frequency in humans who are occasionally exposed to low-level contamination," Weinzierl said. "What is needed is a more honest attitude that recognizes we don't know as much as we would like to about the relationships between pesticides and cancer."

From an article in Illinois Agri-News, May 5, 1989.

New Probe Detects Plant Viruses

A new diagnostic probe that detects at least 35 distinct plant viruses, some of which can lower the market value of a vegetable or ornamental by 75 percent, will be on the market in a few years, according to a U.S. Department of Agriculture scientist.

Ramon L. Jordan of USDA's Agricultural Research Service, a codeveloper of the test, said it is a monoclonal antibody probe that detects potyviruses, named for potato virus Y. Protein from the viruses was injected into mice whose spleen cells were subsequently used to develop cloned hybrid cells that produce the unique antibody used for the probe.

Agdia Inc. of Mishawaka, Indiana, is using the antibody to develop a commercial kit to detect potyviruses in seeds or plants, said Jordan. The kits will first be sold to researchers and then to seed companies, growers, food processors, and private firms and government agencies that certify seeds and plants as disease-free.

Jordan and colleague John Hammond of the Florist and Nursery Crops Laboratory in Beltsville, Maryland, developed the potyvirus-specific antibody. They have applied for a patent. "The antibody binds to the coating of all potyviruses we've tested so far—more than 65 isolates—making it the first to detect such a broad spectrum of plant viruses," Jordan said. Potyviruses stunt, wilt, kill, or lower fruit production for a wide range of crops worldwide.

"Right now, tests detect only a single virus or a few closely related strains, and those tests have to be run one at a time," said Jordan, a plant pathologist. According to Jordan, there are about 38 definitive potyviruses and at least 60 more that may prove to be in this group. He said affected plants can include beans, beets, celery, clover, corn, lettuce, onions, papaya, peanuts, peas, peppers, plums, potatoes, soybeans, sugarcane, tobacco, turnips, watermelon, wheat, yams, zucchini, and other crops. Many flowers such as irises, gladioluses, lilies, and tulips are also susceptible.

Roger H. Lawson, the laboratory's research leader, said, "Unless seeds are certified as disease-free, a potyvirus such as lettuce mosaic virus can greatly reduce yields. Just a few infected seeds can ruin a whole crop." Lawson also said that seed testing is increasingly important to the industry. All lettuce seed, for example, is tested with a conventional rabbit serum antibody kit for lettuce mosaic virus.

"This new monoclonal antibody kit will provide a sensitive method for testing seed for potyviruses," he said. "The kit could also be used by nurseries to test vegetatively propagated plants before they are grown in large quantities." A worldwide market is foreseen for the kit.

From an article in Illinois Agri-News, November 3, 1989.

Safety Critical to Storing, Mixing, and Rinsing Chemicals

Do you store pesticides within reach of children or pets? Do you mix chemicals and rinse sprayers on the same bare soil site time after time? If your answer is "yes" to either or both questions, you may be gambling with the health and safety of your family and friends. Here are some thoughts on improving the safety of your agricultural chemical storage and mix-rinse practices.

Storage. Crop chemicals should always be stored under lock and key. At the very least, this means a structure with locking doors. Even better is a building surrounded by a security fence with a locking gate. The fenced building could easily be worth the investment.

You will derive two benefits—safety and protection from theft.

If you have an inadequate storage structure or none at all, now is the time to consider building one. Plans for a pesticide storage and mixing building are available from Midwest Plan Service, Iowa State University, Ames, Iowa 50011.

Mixing-rinsing. Continually mixing chemicals and rinsing sprayers on the same bare soil site can lead to trouble. Pesticide concentrations overload the absorptive and chemical breakdown abilities of the soil. This sets the stage for leaching deep into soil, threatening nearby water wells.

Also, if rinse water or leftover spray enters a nearby ditch, you may contaminate a stream or river. Chemicals in the ditch endanger children, pets, livestock, fish, and wildlife.

Authorities are working to establish universal guidelines for mixing-rinsing stations. So far, they haven't agreed on any standards. Check with your local, county, and state officials to learn of any current regulations applicable to you. Possible sources of information are your state EPA, state department of agriculture, or county and state boards of health.

The main point is to stop mixing and rinsing on a single dirt site. It's much better to use a concrete pad with a collection sump. Type II Portland cement is recommended for the pad because it keeps chemicals from seeping into the soil or entering ditches. But what do you do with leftover spray and rinse fluids, often called rinsates?

In such cases, fluids usually are collected, held in aboveground tanks, then recycled. They are used later when mixing batches of the same chemical. For example, soybean herbicide rinsate diluted to 5 to 10 percent of field strength can be reused as follows: Use 20-percent rinsate with 80-percent fresh water. Add the normal rate of herbicide concentrate. This provides a mixture with 101 to 102 percent of the strength you'd get if using 100-percent fresh water with the normal rate of chemical. Another approach is to use leftover spray and rinsate in the field. Excess chemical is dispersed on the use site instead of being hauled back to your farmstead.

Here's a tip for effective washing of spray tanks: Wash the interior of the spray tank thoroughly using 7 to 10 gallons of fresh water for each gallon of pesticide mixture in the tank. Spray this washwater over the field you've just treated and repeat until the sprayer is empty. Apply washwater to areas that will benefit most from the chemical. With a herbicide, for example, you might apply washwater to your turning areas, weedy edges, etc.

Remember, you have an obligation to practice good pesticide stewardship. Give as much attention to your

chemical storage methods and mix-rinse practices as you give to the actual application of these products.

From an article in Crop Protection Management.

Play it Safe with Anhydrous

It happened three years ago this spring, but Dean Shields, Gorham, Illinois, remembers like it was yesterday. "My father-in-law was working with anhydrous when a pin came loose and the quick coupler snapped apart. He thought he had it back together, but liquid anhydrous squirted in his face and burned his eyes," Shields recalls. "And he wasn't wearing goggles."

Shields' father-in-law recovered, but the incident was too close to home for Shields. These days you'll never catch him working with anhydrous ammonia without goggles, rubber gloves, or a long-sleeved shirt. He always keeps a squirt bottle filled with water nearby.

Those are key safety elements when working with anhydrous, says University of Illinois Extension Farm Safety Specialist Bob Aherin. The word anhydrous literally means "without water." The chemical will draw water from the nearest source, including the human body. "It seeks out moisture when it's in the soil, but it also seeks moisture when it gets on the skin or in the eyes," he says. A sudden blast from a leaky tank coupler could cause serious skin burns by pulling moisture out of skin, leading to blindness, or death if ingested.

Anyone who works with anhydrous ammonia should wear rubber gloves and goggles and keep as much skin surface covered as possible. Heavy coveralls made from wool or cotton are best. Don't use gloves made from synthetic material because they can crack and be penetrated. "It's a good idea to put a cuff on gloves or roll them up so no substance can run down inside the glove," Aherin says.

He recommends using full-faced protective gear, or a face shield. "The main thing is to protect eyes, nose, mouth, and skin. Most deaths are caused by severe damage to the throat and lungs from a direct blast to the face. The potential is to inhale a large amount of it, and the throat swells shut." At the least, wear goggles to protect the eyes. Meanwhile, check valves on the tank to make sure they're not corroded. Stay away from the safety relief valve if possible, and make sure you're protected if working near it.

"The best first aid measure is to flood the skin or eyes with water," Aherin says. "That's why it's critical to have water available when you're dealing with anhydrous. If it isn't, the injuries can be much more significant." If you get shot in the eyes, irrigate the eyes for at least 15 to 20 minutes. "The critical mistake many people make with anhydrous is they don't irrigate the eyes

long enough after the incident. They go to the doctor, but they stop irrigating their eyes and the damage continues."

Many states require that a 5 gallon tank of water be attached to all ammonia nurse tanks. Most dealers are careful to obey this law, but during the busy season you should double check to make sure the water is fresh. Aherin also recommends carrying 5 gallons of water on the tractor or truck "because there may be situations where the hose may break on the tank. If it's serious, you may need at least 10 gallons of water."

In addition, carry a squeeze bottle of water in your shirt pocket. A small ketchup or mustard bottle will suffice. That smaller bottle will give temporary relief until you get to a larger water source.

From an article by Michael Wilson in the Prairie Farmer, February 21, 1989.

Ten Steps to a Healthier Life and Reduced Cancer Risks

The following ten steps were put together by the American Cancer Society. Several of them can be used to promote fruits and vegetables. All of them may keep us alive and healthy longer. Be careful out there!

1. **Eat more cabbage-family vegetables.** Important studies show that these vegetables (also known as crucifers) appear to protect against colorectal, stomach, and respiratory cancers. The cabbage family includes broccoli, cauliflower, Brussels sprouts, all cabbages, kale, kohlrabi, and mustard.
2. **Add more high-fiber foods to your diet.** A high-fiber diet may protect against colon cancer. Fiber can be found in fruits, vegetables, and whole grains.
3. **Choose foods with vitamin A.** This vitamin may help protect against cancers of the esophagus, larynx, and lung. Fresh foods with beta-carotene, such as deep green, yellow, or orange vegetables and fruits, and not vitamin pills, are the best source.
4. **Eat more foods with vitamin C.** This vitamin may help protect against cancers of the esophagus and stomach. It naturally occurs in many fresh fruits and vegetables, such as citrus fruits, melons, papayas, strawberries, kiwi fruit, bell peppers, broccoli, cabbage, cauliflower, and tomatoes.
5. **Control your weight.** Obesity is linked to cancers of the uterus, gallbladder, breast, and colon. Lower calorie intake and exercise help you avoid gaining weight. Walking is an ideal exercise for most people, and it

primes you for other sports as well. Check with a physician before starting a regimen of strenuous activity or a special diet.

6. **Trim fat from your diet.** A high-fat diet increases the risk of breast, colon, and prostate cancer. Fat-loaded calories lead to weight gain, especially in the absence of exercise. Cut overall fat intake by eating lean meat, fish, skinned poultry, and low-fat dairy products. Avoid pastry and candies.

7. **Omit salt-cured, smoked, and nitrite-cured foods from your diet.** Cancers of the esophagus and stomach are common in countries where these foods are eaten in large quantities. Choose bacon, ham, hot dogs, or salt-cured fish only occasionally.

8. **Stop smoking cigarettes.** Smoking is the biggest cancer risk of all. It's the main cause of lung cancer and the cause of 30 percent of all cancers. Smoking at home results in more respiratory and allergic ailments in children. Pregnant women who smoke harm their babies. Chewing tobacco increases the risk of mouth and throat cancers.

9. **Drink alcohol in moderation.** Excessive drinking increases the risk of liver cancer. Smoking and drinking alcohol greatly increase the risk of cancers of the mouth, throat, larynx, and esophagus.

10. **Protect yourself from the sun's rays.** Too much exposure to the sun causes skin cancer and other skin damage. Use sunscreen of at least factor #15, and wear long sleeves and a hat, especially during midday hours (11 a.m. to 3 p.m.) Do not use indoor sunlamps, tanning parlors, or pills. Changes in a mole or a sore that does not heal should be reported to a physician.

From the 1988 Produce Marketing Association Yearbook.

Crucifers and Cancer

Chalk another one up for the cole crops. We all know eating lots of broccoli may help to prevent cancer, but new research shows that other cruciferous vegetables—collards and cabbage—may also help keep the disease from spreading, reports the June 1989 *Nutrition Action Newsletter*.

At the Institute for Research on Cancer and Allied Diseases in Omaha, Nebraska, mice that had been exposed to cancer were then fed diets of 5- to 9-percent dried collards or cabbage. After three weeks, these mice had a lower incidence of the disease than the control group, which had been fed a vegetable-free diet with an equal amount of fiber.

"Our results agree with other studies that cabbage and collards may have some protective effect," says Eric Scholar, who conducted the experiment. However, he adds that more research is needed before he can extrapolate to other animal models such as humans.

From National Gardening Magazine, October 1989

The Greener the Greens, the Better

"Eat your greens" is even sounder advice than our grandmothers thought in light of nearly 20 years of research findings that link these vegetables with a lower risk of cancer—and the greener the greens, the better, a United States Department of Agriculture (USDA) chemist reported last month.

"The greener the vegetable is, the higher its level of chlorophyll, and that means higher levels of carotenoids," said Frederick Khachik of USDA's Agricultural Research Service (ARS). Carotenoids are the red and yellow pigments, including beta carotene, thought by some to protect against cancer.

Khachik and colleagues at the ARS Nutrient Composition Laboratory in Beltsville, Maryland, analyzed carotenoid levels in six green vegetables eaten in the United States and in nine common to the Cook Islands in the South Pacific, where the relationship of diet to cancer is being studied.

They also assessed the effects of boiling, steaming, and microwaving on carotenoid levels in U.S. vegetables using sensitive analytical techniques they developed. The studies were funded by the National Cancer Institute.

"All green vegetables have the same carotenoids but in varying concentrations," Khachik reported at the fall meeting of the American Chemical Society in Miami. "You can actually see the difference by the intensity of the color."

U.S. kale had the highest concentrations of important carotenoids—about twice those in U.S. spinach and in Chinese cabbage from the Cook Islands, but levels in popular mainland vegetables, such as green beans and broccoli, were generally not as high in carotenoids as were popular Cook Island greens such as hibiscus leaves, silverbeet leaves, and taro leaves, Khachik said. Of the six carotenoids found in green vegetables, only three—alpha and beta carotene and lutein—are detectable in human blood, he explained.

Carotenoids generally break down when exposed to air, light, or heat. In earlier analyses, Khachik said he saw big differences in the compounds' response to cooking. Some degrade completely, others only partially, and some remain stable, while others convert to other carotenoids.

The team analyzed three U.S. vegetables—broccoli, green beans, and spinach—while raw and after being boiled, steamed, and microwaved. The compounds found in human blood—the carotenes and lutein—were heat stable, he said. "Even after boiling green beans for one hour, we ended up with the same amounts." The method of cooking "didn't make a hill of beans of difference."

From an article in Illinois Agri-News, November 3, 1989.

Calling All Bees!

Honey bees passing over your fields in favor of sweeter pastures may leave you worrying about unpollinated crops. Take heart. Now you can apply a batch of Bee-Scent, recall those errant insects, and keep them on your crops long enough to finish the job, reports the May 1989 *Great Lakes Fruit Growers News*.

Bee-Scent is a spray containing bee pheromones—scents manufactured by the insects that produce a response in bees of the same species. These particular pheromones lure honey bees to crops that require pollination to bear fruit, explains Daniel Mayer, Extension Integrated Pest Management specialist at Washington State University's Research and Extension Center in Prosser.

After applying Bee-Scent to crops, Mayer noticed appreciably greater numbers of honey bees for up to 96 hours. "Although the Bee-Scent doesn't remain on plants for long," he explains, "the bees will continue to work an area for three to four days after they've been drawn to it." The result is a higher percentage of pollinated flowers with correspondingly heavier crop yields, especially in orchards.

Mayer has worked with Bee-Scent in experimental and private orchards in Washington state for the past three years. He was joined last year by researchers at Michigan State University in East Lansing, who have found the product effective in apple orchards. The spray has also proved beneficial in pear, blueberry, cherry, plum, avocado, cranberry, melon, cucumber, and other cucurbit plantings, and is currently being tested for other fruits and vegetables.

Growers can obtain Bee-Scent from Scentry, Inc., 610 Central Ave., Billings, MT 59102.

From an article in National Gardening Magazine, October 1989.

Canadian Colored Spuds

It's pronounced Cah-REE-bay and its purple skin and white flesh are making this potato a hit on Canada's east

coast. Caribe is one of the several colorful potato varieties causing consumers to take a second look at a vegetable that traditionally has been considered cheap and unexciting.

"People have tended to think of potatoes as a plain, generic product," said Richard Tarn, a potato breeder at Agriculture Canada's Fredricton research station. "Consumers can now buy name-brand potatoes that are marketed in a way that appeals to a generation looking for something more."

The station, which has been developing potato varieties for 40 years, is one of several Agriculture Canada research stations playing a major role in breeding spuds with advertising appeal for the Canadian market, according to an agency press release. "For such an excellent food source, the potato has been an underrated crop," Tarn said. "We feel we really need marketing that gives the producer and retailer something to sell. The new varieties add interesting packaging to a product that is already low in calories and sodium and that contains vitamin C."

Following the lead of the apple industry, potato breeders are playing up the identity of their varieties with names like Purple Chief, Blue Mac, Brigus, Bintje, and Red Pontiac. Although the marketing is new, jazzy potatoes are common in their native Andes mountains of South America. The local varieties come with white, yellow, red, or purple skins, and flesh that is white or light-to-deep yellow.

It is these characteristics that Agriculture Canada's potato breeders are busy cross-breeding into new varieties for Canadian consumers. Researchers first hit marketing gold in 1980 with Yukon Gold, a light yellow, fresh market potato with pink eyes and a smooth, almost buttery taste.

"The success of Yukon Gold is that retailers have been able to sell it on its particular characteristics," Tarn said. "It lends itself to catchy marketing that describes Yukon Gold as the potato with the butter already in it." Since then, consumers have seen an increasing array of colored potatoes on the market; including national exposure for regional favorites like the West's red-skinned varieties and the East's purple-skinned spuds. New potatoes that soon may make their way to supermarket shelves include the yellow flesh and red or rose skin of Red Gold and Rose Gold.

Despite the number of potato variations already on the market, Tarn said the future is brighter than ever for growers. U.S. markets are also responding to varietal potatoes. Remember to promote the distinct characteristics of the potato varieties you offer.

From an article in The Packer, March 25, 1989.

Effects of Removing Aerial Bulbs on Garlic Yield

Rocambole-type garlic commonly produces aerial bulbs during the growing season. Since these aerial bulbs have no economic value, it is possible that yields would be improved if they were removed.

When garlic planted last March began to produce aerial bulbs in July, twelve pairings of bulbs were selected, each separated by a border plant. One plant of each pair had the aerial bulb group removed. When all top growth had died, the yields were taken. Garlic plants with aerial bulbs removed were observed to mature more rapidly and averaged 73 percent greater in weight (topped 13.4 grams vs. untopped 7.7 grams), indicating that garlic yields can be dramatically improved by removing the aerial bulbing groups when they first appear.

Submitted by Whitney S. Cranshaw, Extension Entomologist, Colorado State University.

Pawpaw Those Pests

A bark extract from the pawpaw tree may join the ranks of the already popular biological pest control, *Bacillus thuringiensis*. "It has proved successful in Purdue University field trials against squash bugs, cabbage worms, bean leaf beetles, and striped cucumber beetles," says Jerry McLaughlin, Ph.D., of Purdue's department of medicinal chemistry. The university has been developing the product since 1981. A company is needed to underwrite the toxicity studies required by the Environmental Protection Agency.

The tree (*Asimina triloba*) is native to the eastern United States. "The extract is easy to make," McLaughlin says. "The powdered bark alone seems to work as a talc, without extraction, as does a simple dilution of the powder, and it's inexpensive."

From the Organic Gardening Magazine, October 1989.

Sell Corn Smut, But Call It Maize Mushroom!

If your sweet corn crop is peppered with corn smut, don't discard it. The corn fungus abhorred by farmers for years can put cash in your pocket. Ears with the fungus are considered a food delicacy in many upscale restaurants, and New York buyer Christina Arnold is buying all she can find. Arnold is convinced that corn smut will grow in popularity and offers an alternative cash crop to farmers.

She said, "Of course it will not achieve widespread popularity by referring to it as 'corn smut'." She is educating farmers to call it "maize mushroom," "Mexican truffle," or "Cuitlacoche." "It's really a maize mushroom," Arnold explains as she breaks off a piece of the fungus and eats it raw, "because it grows on corn and tastes similar to mushrooms."

Arnold explains that for best results, the maize mushroom should be thoroughly cooked before serving to develop its flavor. Arnold, who grew up in Mexico, remembers eating the delicacy during her childhood. She said, "There are more than 2,000 distinct Mexican dishes. I'd like to raise the standard of Mexican food by introducing some of Mexico's incredible, unique dishes."

Supplying maize mushrooms is no easy task. First the ears containing the fungus must be spotted. Maturity is reached about one week before sweet corn maturity. It must be hand-picked to prevent damaging or bursting the mushroom. Silk should remain intact. Ears must be stood on end vertically and kept refrigerated (not in plastic but wrapped in paper) if not used within 24 hours. Prices for "mushroom" ears have been running about 50 cents per ear, versus about 15 cents per ear for conventional sweet corn.

Smut can be found on the tassels, ears, kernels, stalks, or leaves of corn. Arnold wants the part that grows on the kernels, as the corn is also used in cooking. As the galls enlarge, they are glistening, greenish, or silvery-white. Later, the inner tissues darken due to spore formation. If the black color has developed, the product is too old for use. The white outer membrane remains intact until the gall ruptures. A single smut gall of medium size contains more than 200 billion spores.

Arnold wants to convince farmers that the maize mushroom is a viable cash crop. There's a large middle-class Hispanic population spending a potential \$24 billion a year that should be exploited by the American farmer. She wants to stop farmers from looking at the maize mushroom as a troublesome fungus instead of as a cash crop. Last year, Arnold purchased 50 pounds from farmers and this year, 3,000 pounds. "I could have sold tons if I had had it," she said.

Because the maize mushroom must be picked up within 24 hours or be refrigerated, Arnold is experimenting with renting cold storage space in pickup areas. She said if farmers would band together and select a pickup point, it would be most favorable. The ears stay fresh under refrigeration for five days. Although ears can also be frozen and do not lose their flavor, most restaurants prefer them fresh.

Although Arnold is working with the New York market, there is no reason to believe the maize mushroom would not offer similar specialized market appeal

in any Midwestern metropolitan area with an Hispanic community. Perhaps this is a niche market that needs exploring.

From the Pennsylvania Vegetable Growers News, October 1989.

International Sprout Growers Slate First Convention for February 9-10, 1990

The new International Sprout Growers Association plans to hold its first convention and trade show February 9-10. The meeting will precede the United Fresh Fruit and Vegetable Association's convention. Steering Committee Chairman Bob Phipps said, "We are very excited about this premier event and the opportunity to get sprout growers from across this country and Canada together to discuss our industry."

February 9 programs will include marketing produce directly to retailers, role playing on interaction with produce buyers, negotiating techniques on increasing growers' prices, and calculating growers' production costs. A tour of Energy Sprouts, a local sprout-growing operation, will follow the workshops.

Sessions held February 10 are expected to provide convention attendees with information on conducting a national advertising and promotional campaign, educating produce buyers and managers in quality sprout products, dealing with state and nationwide issues concerning organic production, and establishing an industry cooperative.

Registration for the convention is complimentary to all members and includes admission to general sessions, workshops, and the trade show. Nonmembers are welcome to attend the convention for a registration fee of \$200. Optional luncheons and social programming events can be purchased separately.

For more information, contact the International Sprout Growers Association, 7300 Lincolnshire Drive, Suite 200, Sacramento, CA 95823 (916) 399-9846.

From an article in The Packer, November 25, 1989.

Third Annual International Horseradish Festival Issues Invitation

The Third International Horseradish Festival (IHF) will be held Saturday, May 5, 1990, in Woodland Park, Collinsville, Illinois. The festival committee invites the public to attend this unique event. Potential exhibitors and those seeking further information should contact the IHF committee at 221 West Main, Collinsville, IL 62234 (618) 344-2884.

Last year's event drew an estimated 3,000 people despite record-breaking cold and snow flurries. This year, the one-day event will again likely feature a 5-K run, horseradish root toss, horseradish recipe contest, and the horseradish eating contest for the foolhardy and the brave. The festival will have live music, other entertainment, and a wealth of freshly-ground horseradish, which all food vendors are required to provide.

This year the organizers hope to include hot air balloons and more stage entertainment. Approval has been received from the Secretary of State's Office for the issuance of a Special Event License Plate, which will be on sale 60 days prior to the festival. In short, a good time can be had by all. Why not plan to attend?

Submitted by George Astling, Co-Chairman of the IHF Committee.

1990 Illinois Fruit and Vegetable School Schedule


January 3	Northern Illinois Vegetable Growers School, Carpentersville. Contact Bruce Spangenberg (815) 338-3737
January 3-5	Illinois Agricultural Pesticide Conference, Illini Union, Urbana. Contact Kevin Steffey (217) 333-6652
January 4	Indiana-Illinois Vegetable Growers School, Schererville, Indiana. Contact Greg Stack (708) 532-4369
January 4	Southern Illinois Bedding Plant School, Belleville. Contact Charles Willman (618) 443-4364
January 15-18	Illinois Specialty Growers Convention, Springfield. Contact Bill Courter (618) 695-2444
January 23	Union County Vegetable Growers School, Cobden. Contact Kevin Kirby (618) 833-6363
January 24-25	Monroe, Madison, St. Clair Counties Vegetable Growers School, Edwardsville. Contact Chris Doll (618) 656-9227
February 1	Quad-City Fruit and Vegetable School, Moline. Contact Carl Cantaluppi (309) 796-0512

February 6	Apple and Peach Growers' School, Centralia. Contact Harold Hunzicker (618) 548-1446
February 7	Apple and Peach Growers' School, Cobden. Contact Bob Frank (618) 687-1727
February 8	Calhoun Fruit School, Hardin. Contact Rich Zipprich (618) 576-2293
February 9	Apple Growers' School, Quincy. Contact Bill Million (217) 223-8380
February 12	Illinois Asparagus School, Moline. Contact Carl Cantaluppi (309) 796-0512
February 13	Apple Growers' School, Effingham. Contact Bill Brink (217) 347-7773
February 15	Apple Growers' School, Princeton. Contact Bob Hayward (815) 875-2878
February 16	State Line Apple School, Richmond. Contact Bruce Spangenberg (815) 338-3737
February 17	Rockford Vegetable Growers' School, Rockford. Contact Laura Wyatt (815) 987-7379
March 6	Illinois Small Fruit School, Mt. Vernon. Contact Dan Meador (217) 333-1522
March 7	Illinois Strawberry School, Mt. Vernon. Contact Bill Courter (618) 695-2444
June	Orchard Field Day (day and location to be announced). Contact Dan Meador (217) 333-1522

New Publications Available

Rick Weinzierl, whose article on pesticide toxicity appears in this newsletter, and Tess Henn have collaborated to produce two new publications. They are Circular 1295, *Microbial Insecticides*, and Circular 1296, *Botanical Insecticides and Insecticidal Soaps*. Both deal with different alternatives to synthetic chemical insecticides.

These circulars are available from the Office of Agricultural Communications and Education, 69 Mumford Hall, 1301 West Gregory Drive, Urbana, Illinois 61801, (217) 333-2007. There is a \$1 charge for C1295, and a \$2 charge for C1296. As the conventional pesticide picture continues to change and be challenged, these references may become more and more valuable to vegetable growers.



Charles E. Voight
Extension Specialist
Vegetable Crops

HOT OFF THE PRESS

◆ New Publications from the Office of Agricultural Communications and Education ◆

1990 Illinois Pest Control Handbook

\$12.00 IPC1990

Contains guidelines for insect, weed, and disease management and provides information on pesticide application and equipment. Includes a complete subject index. Contains circulars on various related topics which can be purchased separately. 441p.

New Series: Alternatives in Insect Management

Alternatives in Insect Management:

Microbial Insecticides

\$1.00 C1295

Presents the advantages and disadvantages of using microbial insecticides. Discusses all registered microbial pesticides and the conditions that favor their use. 12p.

Alternatives in Insect Management:

Botanical Insecticides and Insecticidal Soap

\$2.00 C1296

Discusses the origin of these insecticides and summarizes their most effective uses. Also examines the toxicity of botanical insecticides and commonly used synthetic pesticides. 20p.

Horticulture

1990 Insect Pest Management Guide:

Commercial Vegetable Crops

\$1.00 C897-90

Suggests insect pest management programs that include the wise selection of cultural, mechanical, biological, and chemical methods. 8p.

1990 Insect Pest Management Guide:

Home, Yard, and Garden

\$1.00 C900-90

Discusses the safe use of insecticides to control pests in lawns, vegetables, flowers, trees, and shrubs. 12p.

1990 Insect, Disease, and Weed Pest Management

Guide: Commercial Application for Trees and Shrubs

\$2.00 C1264-90

Guidelines for pesticide application intended for Illinois commercial lawn and tree-care personnel, municipal arborists, urban foresters, and nurserymen. 20p.

1990 Weed Management Guide for Commercial

Vegetable Growers

\$1.50 C907-90

Suggests guidelines for using herbicides. Includes tables for their use on various vegetable crops. 16p.

1990 Turfgrass Pest Control

\$1.00 C1076-90

Suggests ways to control insects, weeds, and diseases in turfgrass. 8p.

Home Fruit Pest Control

\$1.00 C1145-90

Helps home gardeners keep pests from ruining their fruit. Discusses sprays and spraying schedules, and preventing mouse, rabbit, and bird damage. 8p.

1990 Disease Management Guide for Commercial

Vegetable Growers

\$1.00 C1184-90

Presents the vegetable fungicide tolerances and application intervals for various crops as approved by the FDA and the EPA. 8p.

Please enclose check or money order. Make checks payable to the University of Illinois. To order by phone, call (217) 333-2007. Send order form with remittance to Office of Agricultural Communications and Education, University of Illinois, 69F Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801.

PUBLICATION NO.	TITLE	UNIT PRICE	QTY.	DISC.*	PRICE
* A 10% discount is offered on orders of 10 or more copies of a single publication. For orders of 50 or more copies, a 20% discount is offered.					TOTAL

Name _____

Address _____

City _____ State _____ Zip Code _____

FEIN or Social Security Number _____

(required for credit sales only; credit sales are not permitted for orders totalling less than \$10.00)

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



Illinois Vegetable Farmer's Letter

COOPERATIVE EXTENSION SERVICE

COLLEGE OF AGRICULTURE
UNIVERSITY OF ILLINOIS
AT URBANA—CHAMPAIGN

Vol. 10, No. 1

After a mild and short winter, spring is suddenly upon us. Most people who work with the soil, like you and me, are in a rush to get caught up, even before the season begins.

This issue of the newsletter has a variety of articles submitted by my colleagues and gleaned from other places. I hope you will find some of them interesting as well as informative about new problems, procedures, or products.

1990 Illinois Specialty Growers Convention

The convention of the Illinois Specialty Growers Association held January 15-18 at the Prairie Capital Convention Center was a big success. The Illinois Herb Association was welcomed on board with a two-day blitz of educational sessions and an attractive array of displays in the trade show. Attendance dipped only slightly under 1989's record crowd, despite competition from other conventions in nearby states. Sessions addressing pesticide concerns, including organic growing topics, were especially timely and well received. A social highlight was the reception at the Old State Capitol, with Abe Lincoln himself in attendance. With the new name and new members, the Illinois Specialty Growers Association has set a standard of excellence for the 1990s.

Proceedings and Convention Tapes Available

Proceedings of the 1989 convention of the Illinois Fruit, Vegetable, and Irrigation Convention and the 1990 Illinois Specialty Growers Convention are available for \$15, postpaid, from the Department of Horticulture, 1105 Plant Sciences Lab, 1201 South Dornier Drive, Urbana, IL 61801. Make checks payable to the University of Illinois.

AGRICULTURE LIBRARY

APR 13 1990

UNIVERSITY OF ILLINOIS

March 1990

The Herb Proceedings from the 1990 convention will also be available at the same address in late April. This volume contains papers by most of the speakers in the herb sessions, as well as selected topics from the marketing and specialty sessions. Cost is \$10, postpaid.

Audio tapes of most of the educational sessions are available from Follick Recording Service, 1401 S. Madison, Normal, IL 61761, (309) 452-9073. Write or call for a list of tapes available and for price information. (Most tapes contain two talks and cost \$6.75 plus 6-3/4 percent sales tax.)

Poast Labeled for Edible Beans

Poast has been labeled for use in edible legumes, including snapbeans, green beans, lima beans, and peas. Poast is a postemergence herbicide that controls emerged grass weeds. It is absorbed by the foliage of grasses and translocates throughout the plant. Growth of the grass usually stops soon after application. Reddening of the foliage and burnback usually occur within three weeks of application.

Poast should be applied to actively growing grasses using ground equipment when the grass is small. The application rate varies depending on the grass present and its size. Wild proso millet up to the 10-inch size is controlled by 1/2 pint of Poast per acre. Control of volunteer cereals and corn requires up to 1.5 pints per acre. The label contains important information on the rate of Poast to use and the grass sizes that it will control. Do not make applications to grasses growing under stress due to lack of moisture, cold temperatures, or mechanical injury, since control may be unsatisfactory.

It is important to include spray additives with Poast to obtain adequate grass control. In general, a non-phytotrophic oil concentrate should always be added to the spray solution at 2 pints per acre. Under some conditions, with oil concentrates, a slight leaf speckling on the beans may occur. The crop outgrows the symptoms and later growth is not affected. For best control of volunteer corn, large crabgrass, wild oats, volunteer cereals, and quackgrass, either ammonium sulfate (AMS) or urea ammonium nitrate (UAN) should be

used in addition to the oil concentrate. The AMS should be added at 2.5 pounds per acre, while the UAN should be added at 1 gallon per acre.

There are important limitations that must be observed when applying Poast. Do not apply Poast within 15 days of harvest to succulent snapbeans, lima beans, or peas. If dry beans or peas are being grown, do not apply Poast within 30 days of harvest. Do not apply more than a total of 4 pints per acre of Poast in a season. Therefore, if snapbeans or peas are being double-cropped, a total of 4 pints of Poast can be applied to the field. Do not mix Poast with any other pesticide or additive, except those listed on the label. Poast should not be mixed with other postemergence herbicides, or injury to the legume may occur.

Pest Management Survey in Fruits and Vegetables

A survey on pest management and pesticide use in fruits and vegetables grown in Illinois was mailed on October 31, 1989. Most of the completed surveys were returned within 3 weeks after the mailing, with 50 percent of the returns occurring 1 week after the mailing. A total of approximately 410 surveys were returned, with 330 of the surveys having usable responses. There were a total of 4,421 acres of fruit crops and 12,680 acres of vegetable crops represented in the survey.

The survey respondents represented a cross section of the fresh market Illinois fruit and vegetable growers. The greatest percentage of respondents were from the northeastern portion of the state. The smallest percentage of respondents were from the east central and southeast portions of the state. Farm size of the respondents varies depending on the area of the state. Fifty percent of the growers from the northeastern portion of Illinois farmed more than 100 acres, while less than 20 percent of the growers from the northwest and west central portions of the state farmed more than 100 acres. The northeastern portion of Illinois includes the Chicago metropolitan area. The majority of fruit growers responding to the survey had small farms (less than 10 acres). These small fruit growers included most of the strawberry and bramble (raspberry and blackberry) growers.

The use of nonchemical pest management practices varied from only 17 percent of growers using plastic mulches to 72 percent of growers using mechanical tillage and cultivation. The use of nonchemical pest management also varied among different farm sizes. As the table below illustrates, growers with small farms were less likely to use nonchemical pest management practices than were growers with large farms. For example, 25 percent of farms with less than 10 acres used inte-

grated pest management (IPM), while 50 percent of the farms between 11 and 50 acres used integrated pest management. The percentage of growers that used tillage and cultivation also increased (from 61 percent to 89 percent) as the farm size increased.

Table 1. The Use of Nonchemical Pest Management Practices Among Various Farm Sizes

Practice	Farm Size (Acres)*			
	1-10	11-51	51-100	101
percent.			
IPM	25	50	44	35
Cover Crops	32	36	47	42
Mechanical Tillage	61	60	75	89
Plastic Mulch	7	19	19	26
Disease-Resistant Varieties	55	63	69	77

* Thirty-two percent of the farms were 1 to 10 acres; 22.5 percent of the farms were 11 to 50 acres; 10.6 percent of the farms were 51 to 100 acres; and 34.7 percent of the farms were greater than 101 acres.

If you would like information on the survey results or are interested in participating, contact Dr. John Masiunas, 204 Vegetable Crops Building, 1103 W. Dornier Dr., Urbana, IL 61801.

The preceding two articles were submitted by Dr. John B. Masiunas, Assistant Professor of Horticulture, University of Illinois.

Update on Insecticides and Miticides for Vegetable Crops

There are some small changes in insecticide labeling for 1990. Pydrin is no longer being manufactured, but existing supplies can be used according to label directions. Asana will replace Pydrin as a 0.66 pound per gallon concentrate. There are no changes with the other pyrethroids, Ambush and Pounce, except for a new labeled use on all cucurbits, especially for squash bug.

Lannate will continue to be produced and sold for use on vegetable crops, but Nudrin, another name for the same product, will no longer be produced. Existing supplies can be used as in past years.

There are new *Bacillus thuringiensis* formulations, such as Javelin and others. One new formulation is *B. t.* (san diego) M-one. This formulation is active against Colorado Potato Beetle, especially the younger larvae.

Furadan 15G is under review by EPA, but at the present time all labeled uses are still in effect. These include cucumber beetle control on sweet corn.

Kelthane is labeled for mite control on peppers, lima beans, green beans, tomatoes, cucumbers, muskmelons, watermelons, pumpkins, and winter and summer squash.

Submitted by Dr. Roscoe Randell, Extension Entomologist, University of Illinois.

Corn Borer Plant Vaccine

Results from tests involving the world's first plant vaccine show promise as researchers move closer to putting the product on the market. Crop Genetics International, a Maryland-based firm, has developed a biopesticide to combat the European corn borer. The product was tested in the 1989 growing season at the DeKalb-Pfizer Genetics research farm near Illiopolis, Illinois.

InCide, the biopesticide, was developed in 1985 when the company's founder, Peter Carlson, began searching for a way to give plants an immune system like those found in animals. A microorganism known as an endophyte, which can only live inside the vascular system of plants, is the key to the technology. Genetic engineers removed the *Bacillus thuringiensis* gene responsible for producing the caterpillar toxin and introduced it into the endophyte, which is then introduced into corn plants.

Research at the Illiopolis site focused on how to inoculate the corn plants with this altered endophyte. The tests explored ways of inoculating the plant by injecting the biopesticide directly into the seed. In theory, once the seed germinates and the plant begins to grow, the InCide product starts multiplying, thus vaccinating the plant. When the corn borer eats the stalk, it will ingest the toxic endophyte and die. At this time, more work needs to be done to help the endophyte persist and spread in the corn plant.

Efficacy tests are planned for the Maryland research site of Crop Genetics for this summer. "We're actually going to see how it controls corn borers," said Jim Davis, vice president of Crop Genetics. The results of these tests will determine whether research will return to the Illinois site. Preliminary indications are that corn plants treated with the endophyte exhibit nearly 80 percent control.

If all goes according to schedule, InCide will be on the market in 1993. If the vaccine proves to be a success, inoculating other crops for fungal diseases and additional insects may be possible in the future.

From Illinois Agri-News, December 29, 1989.

Organics Standards Fine-Tuned

Environmentalists and organic advocates have high hopes for an organics bill undergoing revision in the Sen-

ate Agriculture Committee. The bill, S-1896, "The Organic Foods Act of 1990," sponsored by committee chairman Senator Patrick Leahy, D-VT, would set national standards and certification requirements for organic produce and foods. Kathleen Merrigan of the Senate committee said in early February that the bill was being "fine-tuned" based on comments from the organic and environmental communities. She said the legislation's fundamental goals remain the same.

The bill's provisions would:

- Establish a USDA "organically produced" label for products that meet strict production standards set forth in legislation; prohibit use of the word "organic" unless standards were met;
- Require inspections, periodic residue testing, civil penalties for violations, and conflict of interest provisions to ensure the rules are followed;
- Require production methods that are ecologically sound and do not involve the use of synthetic pesticides for a minimum of three years prior to any organic certification;
- Make heavy use of existing organic programs in states and private organizations;
- Establish a National Organic Promotion Board made up of organic growers and handlers to set policies, recommend production standards, collect voluntary assessments and conduct promotion and research activities; and
- Set up pilot projects funded through grants to states to study commercial potential of food items produced using minimal amounts of chemicals.

Leahy said that with federal standards in place, "large supermarket chains will more readily purchase organic food." He added that because "foods labeled organic often sell at premium prices, the temptation to misuse the word is great. Consumers are misled into paying too much for inferior goods." He cited a 1989 Louis Harris poll that found 84 percent of Americans would buy organic foods if given a choice and that more than half of consumers would be willing to pay more for organic foods. "But these same consumers want assurances about the products they buy," Leahy said.

Legislation would create a national list of prohibited and approved substances. Some natural substances might be banned while some synthetics might be allowed, if found consistent with natural production. Legislation would prohibit treated seeds in most cases and prohibit the use of irrigation water unless it had been analyzed and approved by state officials. Synthetic fertilizers,

growth regulants, and promoters would be prohibited. Synthetic pesticides, herbicides, and fungicides, along with plastic mulches, would not be allowed. Producers would need an approved organic plan to foster soil fertility, crop rotation, and manure practices.

The bill would allow states to set additional requirements if they were not in conflict with the "goals of organic growing and are not unduly burdensome on interstate commerce." The bill sets stiff penalties for misusing or tampering with the "organically produced" label. The penalty includes up to five years in prison and a \$100,000 fine. Those who issue false certifications would be barred from the organic program for five years.

The bill would bring organic produce under the PACA. Senate committee officials said they plan to hold hearings on the bill this year, but no dates had been set as of February 8.

An Illinois Organic Task Force is also working on a definition for "organic" and an organic labeling bill for the state of Illinois, which will be based on the U.S. bill so that the Illinois bill will be in compliance with the national bill when and if they pass. Various commodity, consumer, and government groups are represented on this task force.

From an article in The Packer, February 10, 1990.

Nitrates in Vegetables

Most of the nitrate in American diets come from a surprising source—vegetables. They account for 86 percent of the average daily nitrate consumed, far more than water or cured meats, a University of Nebraska-Lincoln researcher said. While this isn't a new development, it isn't widely known, said Constance Kies, professor of human nutrition and food service management in the Institute of Agriculture and Natural Resources. According to the National Research Council, vegetables account for 72 percent of nitrite consumed by American adults. Cured meats contribute 9 percent; baked goods and cereals, 7 percent; fruits and juices, 5 percent; fresh meats and water, 2 percent each; and milk products, 1 percent.

This information astonished even Kies, a veteran nutrition researcher. She learned about nitrate content in vegetables when her graduate assistant, Carolyn Bednar, was researching nitrates and nitrites in food. "The day Carolyn mentioned that vegetables have lots more nitrates than meats ever thought of having, there were gasps of amazement," Kies recalled. The information emphasizes some often overlooked facts about foods.

"In nutrition, we are more and more tending to put halos around foods, saying that these are good foods and these are bad foods. That's not the way it happens.

Foods are neither good nor bad, they are a combination," Kies said. For example, beets, beans, and broccoli are good sources of vitamins, including ascorbic acid, which inhibits conversion of nitrates to nitrites and nitrosamines, as well as fiber, which limits nitrate absorption, she said. However, fresh beets contain about 300 parts per million (ppm) of nitrate/nitrogen; fresh snap beans, 145 ppm; and fresh broccoli, 78 ppm. By comparison, the Nebraska Department of Health says 10 ppm is the maximum allowable nitrate/nitrogen contamination in public drinking water. Since people regularly consume more water than beets, elevated nitrate levels in drinking water are a greater health concern than the nitrate content of other foods.

The research supports a message nutritionists have long advocated—"eat a variety of foods in moderate amounts and you're not going to be too bad off." It also illustrates the difference between naturally occurring substances and additives. Food additives are closely regulated, but natural substances are not. Nitrate content varies widely among vegetable species and the part of the plant used. Growing conditions, the amount of nitrate in the soil and water, and other environmental factors also influence nitrate content, Kies said.

Bednar's research shows that preparation methods affect the amount of nitrates in the finished product. She tested commercially processed and home processed beets and spinach. The nitrate content in home canned and frozen beets was higher than in the commercial products. Commercially processed beets are steamed and the skins removed by washing with high pressure water. After beets are packed in the can, boiling water containing salt is added. The commercial processing methods undoubtedly remove considerable nitrate from beets, Bednar said. Other research shows that up to 56 percent of the nitrate in root vegetables leaches into cooking water. Discarding the cooking liquid reduces the nitrate in the finished product, but some vitamins are lost.

People shouldn't stop eating vegetables any more than they should eat only vegetables, Kies said. However, consumers should be aware that foods contain naturally occurring compounds even when no additives are used.

From an article in the Great Lakes Vegetable Growers News, November 1989.

Work to Protect Groundwater

Make groundwater a part of your daily thoughts, if you haven't already done so. Your future could depend on it. Half of all Americans, and nearly all those living in rural areas, use groundwater for drinking. Groundwater has now become a national issue. Seven federal laws and many state regulations address the issue, and more are

likely to do so in the future. Agriculture is now getting close scrutiny for its potential impact on this vital resource.

Groundwater is the water that fills the spaces between particles of sand, gravel, and rock below the water table. It is a source of fresh water that supplies wells and springs.

Here are some ways you can protect groundwater when using crop protection chemicals this year:

- Use extreme caution to protect water wells. Avoid storing or mixing agriculture chemicals near them, and do not dispose of leftover spray in their vicinity.
- Use anti-backflow devices when drawing water from wells or ponds as you mix chemicals.
- When filling a spray tank, always keep the end of the filling hose above the water level in the tank.
- Use approved backflow precautions on irrigation systems, especially when chemicals are being applied through the equipment.
- Avoid using chemicals near sinkholes, which provide quick, direct access to groundwater. Find and properly seal any old or abandoned wells for the same reason.
- Learn to recognize high-risk areas for groundwater contamination. Water moves downward in coarse, sandy soils quickly. It moves through fine-textured soils more slowly. Also, fine-textured soils are more likely to hold chemicals until they break down.
- Remember, the closer the groundwater to the soil surface, the greater the vulnerability.
- Recognize that some crop chemicals are broken down in the soil fairly quickly by chemical and microbial reactions. Others are more persistent and have a greater chance of getting into groundwater. Mobile chemicals have more potential to reach groundwater.
- Use the lowest possible effective rate of agricultural chemicals, especially in high-risk situations. Make applications only when necessary.
- Read and observe labels carefully. This is always an important step, but it has special significance for groundwater. Labels of some products such as Temik contain special statements regarding groundwater protection.

- If you collect irrigation tailwater, find a way to recycle it.

- If you're not disposing of pesticide containers in a safe, approved manner, spend some time now working out a better system.
- Consider surface water on the ground. Chemical spray solutions are more of a threat to groundwater when applications are made to soil where excess water is standing. This applies to rain water and irrigation water.
- Treat your groundwater resource as if you had to drink it, as in most cases, you do.

From an article in Crop Protection Management, February 1989.

Cancer Risks False?

Legislators and regulatory agencies have been misled about pesticide residues in food and their associated cancer risks, according to an environmental toxicologist at the University of California at Riverside.

In an article in the November-December issue of *California Agriculture*, Carl Winter, University of California Cooperative Extension toxicologist, and Sandra Archibald, Stanford agricultural economist, criticize a 1987 National Academy of Sciences (NAS)/National Research Council (NRC) report that has been the bible for dietary cancer risk assessment in the nation's food supply. The report, "Regulating Pesticides in Foods: The Delaney Paradox," has provided the basis for proposed legislation and regulatory decisions to restrict the use of particular pesticides.

"Many of the NRC's cancer risk results are meaningless because invalid assumptions underlie the study. Legislators and regulatory agencies need to know this so that ill-advised proposals do not become the law," Winter said in a university news release. The Environmental Protection Agency (EPA) has begun to incorporate the council's findings into its regulatory policies. Several proposals, based in part on the council's results, are likely to be on the statewide ballot in 1990, Winter said.

Winter and Archibald take issue with two key assumptions underlying the council study that they say overstate the pesticide residues found in food. In calculating dietary cancer risk, the council study assumed that all pesticides registered for use on a particular crop are always applied at maximum levels. The study further assumed that pesticide residues in food are equal to the maximum legally allowable.

"Typically, growers do not use all registered pesticides," Winter said. "Nor do they always apply them at maximum rates with minimum preharvest intervals." In addition, Winter said actual pesticide residues usually are far below legal tolerance levels, based on laboratory tests of raw commodities and ready-to-eat food conducted by the Food and Drug Administration (FDA). A more accurate estimate of dietary cancer risk incorporates actual field data on pesticide use patterns and actual laboratory data on residue levels found in table foods.

Winter and Archibald recalculated the council's dietary cancer risk estimates for several pesticides and selected foods such as lettuce and tomatoes, using as source information actual pesticide residue data from ready-to-eat foods analyzed in the FDA's 1987 Total Diet Study. By recalculating dietary cancer risk based on actual residue levels, rather than on the theoretical levels assumed in the council study, they determined that the council study overstates cancer risks by a factor of 200 to 100,000.

The council's projections are being used by the EPA as documentation in imposing its "negligible risk" standard—one excess cancer per million persons. The EPA uses negligible risk to determine if regulatory action should be considered for individual pesticides. Legislation currently proposed by California Representative Henry Waxman, D-Los Angeles, and Senator Edward Kennedy, D-Massachusetts, relies on the council's results.

"Quantitative risk assessment methodology already suffers from enough uncertainty," Winter said in his release. "We can't afford to confuse the facts with invalid assumptions. Pesticide policy reform must be based on the best scientific data."

From an article in The Packer, November 11, 1989 based on Winter and Archibald's condensed version of a chapter written for a new book entitled Chemicals in the Human Food Chain.

New Horticulture Department Head

Anton G. "Tony" Endress, assistant chief of planning for the Illinois Natural History Survey, was named head of the Department of Horticulture of the University of Illinois on January 11 by the Board of Trustees. He replaces William L. George, associate dean and director of resident instruction for the College of Agriculture, who has served as acting head of Horticulture since August 1988.

Endress received his undergraduate degree from Duquesne University, Pittsburgh, Pennsylvania, and his master's and doctorate degrees from the University of

Iowa. He also did postdoctoral work at the University of California-Riverside. Endress joined the Survey in 1980 and became head of its section of botany and plant pathology five years later.

We welcomed Dr. Endress to his new position at the Illinois Specialty Growers Convention in Springfield last January, just days after the official announcement by the Board of Trustees. Everyone in the department is glad to have a full-time head and welcomes the chance to work with Tony in the years to come.

1990 at the St. Charles Horticulture Research Center

1990 brings another opportunity for the St. Charles Horticulture Research Center to conduct applied research into the cultural practices of commercial vegetable growers in northern Illinois. A number of projects are already being planned. Several are continuations of past work. Bell peppers will continue to be the focus of several projects for the new year. Promising work has been done in the past on management of row tunnels on bell peppers. In 1989, Dr. John Gerber and associates developed a heat unit system for predicting optimum row tunnel removal date. Work will be continued in 1990 to fine-tune that system and rectify some of the other problems associated with row tunnel use on bell peppers.

Another project for 1990 will be continued examination of drip irrigation and water relations in bell peppers. Bell peppers have shown excellent response to drip irrigation in the past and seem to be an excellent candidate for exerted management of water and nutrients. It is a high value crop that is easily stressed with resultant lost quality and productivity. If the grower is given better tools for management of the essential ingredients for pepper production, it is likely that the crop will respond profitably.

Cultivar evaluations are always important to growers, especially in certain crops. After several years of observation trials, a replicated trial of fresh market tomatoes will be conducted at the Research Center. Up to twenty cultivars that have consistently performed well in the recent past will be selected to include in the study. A replicated trial gives the researcher an opportunity to more closely examine the results of a trial and more thoroughly describe differences between entries. Other crops to be trialed include sweet corn and pumpkins.

Growers always have an opportunity to see these trials in action by visiting the Research Center. To do so, call Bill Shoemaker, superintendent, at (708) 584-6166. Also, a Twilight Meeting is held every year as an opportunity for growers, industry personnel, and others to take a tour of the research plots and listen to researchers and Extension specialists discuss research and answer questions.

This year the meeting will be held August 8 at 7:00 p.m. By visiting the Research Center while the projects are underway, the grower can better understand the effect of treatments being studied and how they can help the grower's operation. Make it a point to visit the Research Center this year.

St. Charles Hires New Ag Gardener Foreman

After conducting a search through the winter, the Department of Horticulture has hired Vernon Johnson as the Ag Gardener Foreman at the St. Charles Horticulture Research Center. Vernon has a strong farming background, having been in agriculture all his life, and continues to operate a 200-acre farm near Kirkland, Illinois, as a cash-grain enterprise. Vernon began work in March and is sure to contribute to the efficiency and quality of work conducted at the Research Center. We welcome Vernon and look forward to working with him in the future.

The preceding two articles were submitted by William Shoemaker, superintendent of the St. Charles Horticulture Research Center.

New Specialist at Dixon Springs Agricultural Center (DSAC)

Jeffrey Kindhart has accepted the Horticulture research Extension specialist position at the DSAC, formerly held by Robert Call. He and his wife, Garnet, are originally from the rural Springfield area. They were in Charleston for two years until 1987, when Jeff received his B.S. in Botany from Eastern Illinois University. For the past two and a half years, they have lived in Champaign while Jeff completed his M.S. degree in Horticulture at the University of Illinois. Jeff can be reached at (618) 695-2444 if you have questions or just want to say "Hi!" We welcome Jeff to the staff and wish him good fishing in and around the DSAC.

Pumpkin Performance

Pumpkins for Jack O'Lanterns are grown in observation trials at the Dixon Springs Agricultural Center in southern Illinois. The performance of selected varieties is summarized here. Not all varieties are included each year. The plots are irrigated in extremely dry weather conditions.

Table 2. Performance of Selected Pumpkin Cultivars from Dixon Springs Agricultural Center, 1986 to 1989

Cultivar	Number of years in the trial	No./A	Average yield tons/A	Size (lb)
Howden Field	3	2,400	22.9	19.1
Connecticut Field	1	1,300	11.7	18.0
Thomas Halloween	2	1,250	8.8	14.0
Jackpot	4	2,250	14.6	13.0
Trick or Treat	3	2,300	13.6	11.8
Spirit	3	3,600	19.8	11.0
Pankow's Field	1	2,200	12.1	11.0
Autumn Gold	2	5,150	23.2	9.0
Little Boo (white)	1	1,600	3.2	4.0
Spookie	2	5,800	10.2	3.5
Baby Pam	2	2,550	2.6	2.0
Mini Jack	1	5,200	3.9	1.5

The varieties are arranged by decreasing average size. Howden Field and Connecticut Field have proven to be consistent performers. These fields set the standards by which newer releases are compared for size, shape, color, and yield.

Hybrids such as Autumn Gold and Spirit have produced high yields of medium size pumpkins. Some growers have selected their own strains of Jack O'Lanterns for large size for Halloween sales. One selection, not included in these results, is superior in size, weight, and stem handle characteristics. It will soon be available from a commercial seed company.

Early Tomato Cultivars for Fresh Market

Each year tomato cultivars are evaluated in southern Illinois for shipping to early markets. This report summarizes the performance of 15 cultivars grown in trial on the Cerny Farm, Cobden, in Union County. The plots were not irrigated.

Tomato transplants were grown at the Dixon Springs Agricultural Center and field set on May 1, 1989. The plots consisted of 10 plants grown in a trellis weave system. The plants were pruned one time below the first flower cluster.

The plots were picked twice a week for 9 harvests. The fruit were counted, graded, and weighed. Defects and other characteristics were recorded. Rough and split

fruit were a problem early in the season and gray wall disease was a problem throughout harvest (see notes).

The harvest data are presented in four tables to show the yield of U.S. No. 1 fruit at different time intervals during the early summer marketing period. All cultivars produced firm to very firm fruit. All were crack resistant, except as noted, as indicated by the high percentages of U.S. No. 1 fruit.

Growers in southern Illinois should consider growing more than one cultivar for early markets. This will allow growers to consistently pack a superior product of large, firm, crack-resistant fruit since different cultivars mature in sequence from earlier ones to later ones. At the present time, Pik Red, Pik Rite, Sunrise, Olympic, Solar Set, Celebrity, Mountain Delight, and Mountain Pride provide just such a selection. SF 5000, Jet Star, and Sunny are other cultivars, not included in this particular trial, that may also be grown depending upon the market, time of year, and type of culture.

Dr. Randy Gardner, North Carolina State University, developed Mountain Pride and Mountain Delight. He plans to name and release NC 87127. This has been a superior performer in our trials for two seasons.

Growers are advised to try one or two new cultivars and compare them with their standard ones on their own farms. Cultivars may not perform the same under conditions of different soil, rainfall, temperature, climate, and cultural methods.

This trial was harvested with the assistance of Rob Call and Kevin Kirby.

Table 3 . Early Three Harvests (July 10-17)

Cultivar	U.S. No.1 (lb/plant)	Percent No. 1	Size (oz)
NC 87127	3.5	85	9.4
Sunrise	3.3	67	10.1
Pik Rite	2.8	76	11.1
Solar Set	2.8	62	8.4
Fl 7209	2.8	67	8.0

Table 4. Middle Harvests (July 20-27)

Cultivar	U.S. No. 1 (lb/plant)	Percent No. 1	Size (oz)
Celebrity	5.6	69	11.6
Pik Rite	4.3	74	11.9
NC 87175	4.1	82	10.7
Sunrise	3.9	69	10.5
Olympic	3.3	83	11.1
NC 88289	3.2	68	12.4
HMX 7803	2.7	72	9.7
Solar Set	2.7	54	9.6

Table 5. Late Harvests (July 31-August 8)

Cultivar	U.S. No. 1 (lb/plant)	Percent No. 1	Size (oz)
Celebrity	4.4	72	9.0
Olympic	4.3	60	10.9
NC 87127	3.9	66	10.6
Mt. Delight	2.9	41	9.3
Mt. Pride	2.8	38	9.6
NC 88289	2.7	42	9.1
Solar Set	2.4	36	9.2
Sunrise	2.3	37	10.3

Table 6. Total Yield (9 harvests)

Cultivar	U.S. No. 1 (lb/plant)	Percent No. 1	Size (oz)
Celebrity	11.9	71	10.1
Olympic	9.9	71	11.0
Sunrise	9.4	56	10.3
NC 87127	8.9	73	10.2
Pik Rite	8.5	66	11.6
Solar Set	7.9	59	9.0
NC 88289	7.7	59	10.3
Mt. Delight	7.5	54	9.5
NC 87175	7.4	70	10.5
Mt. Pride	6.8	52	9.4

Notes from the 1989 Season

Celebrity	Excellent producer mid to late season, not as firm as others, vigorous plant. Standard.
Olympic	Tested as PSX 77684 (Peto Seed). Vigorous plant, 14 gray wall, mid to late season Trial.
Sunrise	Consistent production, fruit not as uniform as others. Tested as Asgrow XPH 5551. Also looked good in 1988 at DSAC. Trial.

NC 87127	Best early, 14 gray wall, very uniform, one of the best in the trial, highest percent No. 1 in trial. Best in 1988. Will be released. Seed available for '91 or 92' seasons. Trial.
Pik Rite	Rough early, 4 gray wall, cracking late. Standard for early production.
Solar Set	Consistent production, smaller size than Pik Red, but better resistance to early blight. Tested as Florida 7164. Good production in 1988 at DSAC. Trial. Available from Asgrow.
NC 88289	Vigorous plant, mid to late Mt. Pride season, may be released.
Mt. Delight	Rough early, 1 gray wall, consistent production, smaller than Mt. Pride. Standard.
NC 87175	Mid-season maturity, rough early.
Mt. Pride	Very vigorous plant, 12 gray wall, late standard.
NC 8895	Vigorous plant, 28 gray wall, rough, mid-season.
FL 7209	Smooth, small size compared with Pik Red.
HMX 7803	Rough early, 36 gray wall, large stem scar.
Pik Red	Small plant, 60 gray wall, cracking late, very susceptible to early blight. Did not perform up to par in this trial because of the gray wall. Standard early for large fruit.
HMX 7801	Small, 76 gray wall, picks easily, not as firm as others.

These pumpkin and tomato trial reports were submitted by Dr. J.W. (Bill) Courter, Professor in the Department of Horticulture, University of Illinois.

Jersey Golden Acorn Squash Withdrawn

Hollar & Co., Inc., withdrew Jersey Golden Acorn squash from the market on December 5, 1989, because of scattered reports of people becoming ill after consuming the vegetable. Company representative Larry Hollar said, "We heard of one man reportedly hospitalized in New York and perhaps one or more in Los Angeles."

Reports indicate that a small percentage of the vegetables taste bitter, and Hollar suspects it is the bitter squash that have made people ill.

Although over 99 percent of the letters received about Jersey Golden raved about its taste, a minute number complained of an unbelievable bitterness. These reports and the hospitalizations caused Hollar & Company to stop selling the seed. Bitterness in squash is caused by cucurbitacin, a naturally occurring compound.

While the bitter squash could have made people sick, Hollar can't understand how they were able to ingest enough of it to put them in the hospital—the taste is that bad.

The exact cause of this random bitterness may never be discovered, but the whole process has probably consigned Jersey Golden Acorn to an early death. Some replacement varieties are under development, but it could be two or more years before these are available in sufficient quantities to fill the void left by Jersey Golden.

From an article in The Packer, December 14, 1989.

Fruit and Vegetable Clip Art for Direct Marketers Available Again

There are more than 400 illustrations and names in several sizes and typefaces in this unique and popular clip-art book. The art will help direct marketers develop their newspaper ads, farm brochures, stationery, business cards, farm signs, and other advertising.

Included are illustrations of small fruits (blackberries, blueberries, grapes, raspberries, and strawberries), tree fruits (apples, cherries, and peaches), and vegetables (asparagus, beans, broccoli, cabbage, carrots, cauliflower, pumpkins, squash, sweet corn, and tomatoes).

This valuable resource for direct marketers was reprinted as of March 1990. Order from Dr. J.W. Courter, University of Illinois, Route 1, Simpson, IL 62985. The cost is \$5. Make checks payable to the University of Illinois.

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



Illinois Vegetable Farmer's Letter

Vol. 10, No. 2

Summer is here, but you can hardly tell it around Champaign. The rains that didn't fall in 1988 are finally arriving, along with a healthy dose of 1990 cloudbursts. If you live somewhere in Illinois where rainfall has been below normal for the last three months, let me know, because it has been soggy everywhere I've traveled. Cooler than normal temperatures further complicate matters. As planting is delayed, various problems develop. Shorter-season varieties may need to be selected if the delays continue. Be on the lookout for disease outbreaks that thrive on the continuously moist conditions. Try to avoid working soil that is overly wet to avoid compaction (I know this is hard to resist

when you're already two or more weeks behind schedule). Where possible, keep your options open with regard to herbicide applications. You don't want to get a chemical down, then find that the season left is too short for that crop. Finally, it is very important to avoid the urge to cut corners where safety is concerned. Catching up is not worth risking serious mistakes or injury.

This issue also deals with consumers' food safety concerns, which just don't seem to be going away. Consumers are becoming ever more aware of food safety, for example, the Alar issue and EBDCs (a group of fungicides that may be banned). This season, more than any other, growers need to be ready to answer a variety of questions with level-headed concern, not defensive anger. Although this is difficult when your livelihood is being threatened, the weight of public concern (whether justified or not) dictates the calmer approach. This newsletter has several articles that shed light on various aspects of this complicated situation. If you pay enough attention to what everyone is saying, you may anticipate some of the questions and be better prepared to answer them. On the other hand, so much is said in defense of various positions and approaches, confusion sometimes seems to reign. At the risk of adding to the confusion, I will continue to try to include these issues in future editions as well.

Poll Seeks Consumer Attitudes to Organic Produce

Eighty-four percent of consumers responding to a Lou Harris poll indicated a preference for organically grown fruits and vegetables if the cost was the same as for other produce. The poll, commissioned by *Organic Gardening* magazine, showed 28 percent of respondents have "sought out organically grown produce or produce grown with limited use of chemicals."

Some 52 percent said they would buy organic produce even if it cost more. A similar poll in 1988 found that 58 percent would buy organic produce at greater expense. The telephone poll, conducted in late 1989, involved detailed interviews with 1,250 randomly selected individuals across the nation.

The polls are part of the magazine's effort to create an index of changing attitudes about organic produce and organic production. The first poll was conducted in November 1988. In the 1989 poll, consumers said they ate organic produce because of "long-term health effects." The consumers believed that taste, nutritional value, and health are better with organic produce. The respondents were divided on the appearance of organics; 33 percent said organics looked better, 21 percent said worse, and 42 percent said the appearance was about the same.

The poll asked respondents whether the federal government does a poor or good job of "protecting consumers from pesticides and other chemicals in fruits and vegetables that may be potentially harmful." Forty-six percent said the federal government did a good job, but 48 percent gave the government poor marks.

From an article in The Packer, March 24, 1990.

Facts Are of Little Use in Food Safety Issue

Scientific assessments don't have much impact on the public's view of risk, including the risks from pesticides and residues on food, according to Sharon Begley, science editor for *Newsweek*. Food safety is an emotional issue, and explanations and scientific evidence don't do much to help ease public fears about the safety



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

of its food supply, she told American Farm Bureau Federation members during one of their meetings.

If there is uncertainty about a risk or a person is unfamiliar with the risk, it is labeled "bad." Unlike exposure to risk from driving, smoking, or flying, the exposure to pesticides or residues in even tiny amounts is not something the public voluntarily accepts, she said. Consumers feel their exposure to pesticides is involuntary and uncontrollable, and they think they derive no benefit from their use, putting pesticide use and residues on the "bad" side of the risk line, according to Begley.

Overcoming public concerns about food safety will involve showing consumers that farmers are on the public's side, and that farmers are willing to try to solve the problem rather than trying to explain it away, she said. Farmers at the session commented about their frustration with the food safety issue and how they are being painted as bad guys while trying to produce safe food and stay in business. In response to questions, Begley suggested going beyond science to address public fears. Agriculture needs a program aimed at alleviating consumer fears on an emotional level, she said.

Fred Hegele, director of quality assurance and regulatory affairs for General Mills, stressed that food processors have confidence in the nation's farmers and the quality of our food supply, but they are also concerned about food safety issues. Food processors feel vulnerable to public fears. They are continuing to improve the system for monitoring pesticide residues. Processors are working to have farmers embrace integrated pest management programs to reduce pesticide use. "There are tremendous incentives to find alternatives to some pesticides and to more effectively use those that remain," Hegele said. "We must move beyond a defensive position and take some forward-looking steps to make a safe food supply even safer."

From an article in FarmWeek, January 15, 1990.

Poor Math and Science Skills Add to Food Safety Fears

People are prone to food safety scares because they don't understand enough math and science to make informed decisions, according to the director of Argonne National Laboratory. Alan Schriesheim, head of the U.S. Department of Energy's laboratory, said the public is basing its decisions on information from the media and celebrities because of poor math and science education.

With increasing technology, scientists can measure "traces of anything" and the public doesn't know how to balance traces of chemicals with health risks, Schriesheim said. Such understanding uses statistics and math.

"There is a general tendency to want to live risk-free," he said. "However, we think nothing of getting into a vehicle with 20 gallons of the most inflammable, carcinogenic, incredibly dangerous mixture--gasoline."

Young Americans should be taught to understand risk factors. "I believe a major problem or challenge resides in primary or secondary schools where science and math education is a disgrace," Schriesheim said.

Scientists also have a major responsibility to ease public fears about biotechnology and other new discoveries, he said, adding that they have to help the public understand the application and implications of new technology. Argonne Laboratory offers the largest educational programs among the national laboratories. About 3,400 teachers and students from high schools and colleges participated in laboratory programs last year.

From an article by Kay Shipman in FarmWeek, May 21, 1990.

Anhydrous Ammonia Is Removed from Hit List

The House Committee on Energy and Commerce recently approved an amendment, sponsored by Rep. Terry Bruce (D-Illinois), which removes anhydrous ammonia from a list of reported "air toxics" to be regulated through House "clean air" legislation. Anhydrous ammonia was included on the list as part of the administration's original clean air proposals. Before the Bruce amendment, producers planning to use anhydrous ammonia fertilizers would have been required to adopt "maximum achievable" air pollution control technology when applying the gaseous chemical in fields. "Even technology that's not available but (is) achievable would have to have been applied to basic farm equipment used to apply fertilizer on fields," said Bruce aide Mike Casey. "It would have dramatically increased the cost of farming in the state."

Casey maintained that the House version is "much better" than a recently passed Senate version, particularly regarding protections for the nation's coal miners. Illinois senators Alan Dixon and Paul Simon voted against that bill primarily on the basis of language that would restrict use of high sulfur coal by electric utilities in an effort to reduce sulfur dioxide emissions and, therefore, "acid rain." Dixon expressed concern that reduced demand for high sulfur coal would virtually "decimate" an important southern Illinois industry that employs many part-time farmers. The House bill would provide incentives to encourage continued use of high sulfur coal, with "credits" for utilities that install emissions-reducing "scrubbing" equipment prior to prescribed clean air deadlines.

Bruce plans, when the bill reaches the full House, to push for inclusion of gasoline reformulation language that would encourage substituting current "octane enhancers" with ETBE, an ethanol-derived fuel additive, in 41 U.S. cities with serious air pollution problems. Those cities represent more than 40 percent of the nation's market for gasoline, Casey reported.

From an article by Martin Ross in FarmWeek, April 16, 1990.

Tips for Safe Container Disposal

How do you handle empty pesticide containers? If you have trouble answering this question with a clear conscience, it's time to make some changes. This is becoming one of the hottest issues affecting the use of crop protection chemicals. Clearly, you have an obligation to dispose of empty containers in a responsible manner based on personal and environmental safety.

Burning containers. The industry shift to more combustible containers has simplified the issue for many farmers. It's relatively easy to burn empty paper and plastic packages while you're in the field. Here are some tips from the National Agricultural Chemicals Association:

- Burn no more than one day's accumulation of containers at one time.
- Burn containers downwind from you and your farm crew, and make sure the smoke does not drift to occupied buildings or public roads.
- Burn containers only during daylight hours.
- Make sure you comply with any applicable state or local regulations regarding burning.

Rinsing containers. Plastic and metal containers for liquid formulations should be thoroughly rinsed as they are emptied. This means triple rinsing. Check this recommended procedure:

- After pouring product into the spray tank, fill the empty container one-quarter full with water. Close the container and shake or roll it vigorously, then drain contents into the spray tank. Repeat this procedure two more times.
- As an alternative method, consider using a pressure rinsing nozzle. These nozzles attach to a hose connected to the pump on your nurse tank. Place an empty container over the opening of your spray tank, with bottom up. Force the nozzle through the bottom of the container and rinse for at least 30 seconds. This procedure applies to containers of up to five gallons. Larger drums can be flushed with a commercially available probe.

Container disposal. Properly rinsed containers are not classified as hazardous waste under federal law, but

suitable disposal is still an important step. First, check to see if your dealer or any local organization has a container recycling program. In some areas this system is working quite well. Farmers deliver triple-rinsed, punctured, crushed containers to a central collection point. The containers, in turn, are delivered in bulk to a suitable outlet.

If no program is available, you need to assume some extra responsibility yourself. Stockpile your containers in a safe location not accessible to pets, livestock, or children and periodically deliver the debris to a suitable outlet. Possible outlets include sanitary landfill sites, metal recycling plants, and reconditioners of metal drums. In some locations, there's also the possibility of high-temperature incineration of plastic and fiber containers, which provides "complete" disposal.

Check pesticide labels for manufacturers' recommendations on container disposal. Finally, make sure you comply with state and local regulations covering this topic, if any exist. Check with your dealer or county Extension agent.

From Crop Protection Management, April 1989.

Computer Simulation Says Encapsulating Pesticides Protects Ground Water

A 50-year computer simulation shows that encapsulating pesticides in cornstarch or other material greatly reduces their movement toward ground water, according to a United States Department of Agriculture (USDA) scientist. "This simulation demonstrates a useful way to study USDA-patented methods of encapsulating herbicides, insecticides, fungicides, fertilizers, and other agricultural chemicals," says hydraulic engineer W.G. Knisel of USDA's Agricultural Research Service (ARS). With these methods, he says, a pesticide is released at a controlled rate from tiny honeycomb-like openings in starch granules. "Considerably less pesticide is needed if it is encapsulated than if it is sprayed. A heavy rainfall right after spraying can make some chemicals leach downward to ground water," he says.

His computer model--USDA's main model for estimating potential ground water pollution--simulates the fate of 14 herbicides applied over 50 years. Each herbicide was in both encapsulated and conventional applications. The model shows that 60 percent to 90 percent less chemical moved below the root zone for encapsulated pesticides on sandy soil. USDA scientists have patented five ways of encapsulating chemicals in cornstarch. Two firms are licensed to develop the process commercially.

The model assumes that a pesticide was applied each April 1 (the area's typical corn planting date) on irrigated

land for 50 years. The years were simulated with weather data compiled from 1936 to 1985 at the Coastal Plain Experiment Station near Tifton, Georgia. Knisel says the greatest advantage of controlled-release pesticides was realized during the wettest years, when rains came right after pesticide applications.

Two soils--one full of clay and the other very sandy--with an 18-inch root zone were chosen to represent extremes. Water, which would carry dissolved chemicals downward, moves much more slowly through clay than through sand. The capsules' benefit was highest on the sandy soil, which had 25 to 145 times greater leaching losses than the clay soil.

From an article in Prairie Farmer, February 2, 1989.

What You Should Know About Aphids

There are thousands of aphid species, and nearly all crops are affected by one or more of them. That's why it's to your advantage to know and understand aphids, because they could cost you money.

Aphids damage crops several ways. They may:

- Suck sap from plant stems and leaves, reducing plant vigor;
- Inject toxins into plants, causing cell breakdown;
- Serve as vectors of viruses that cause plant diseases.

Aphids have the highest reproductive potential in the insect world. Some species can produce 30 to 50 generations in one year under ideal conditions. This ability helps aphids become resistant to certain insecticides. Resistance is now a problem for some crops in some regions.

Aphids are tough, yes, but they can often be controlled naturally. Low or high temperatures and hard, beating rains can reduce populations. So can some aphid fungal diseases. Beneficial insects also help control aphids. The big-eyed bug, for example, can attack and consume a destructive pea aphid half its weight in less than an hour. Lady beetles, small parasitic wasps, and other beneficials can also help control aphids.

Scientists continue to discover facts about the natural enemies of aphids. W.L. Tedders, entomologist at USDA's Southeastern Fruit and Tree Nut Research Lab at Byron, Georgia, recently found that a plant bug found on pecan trees actually feeds on aphids. The plant bug, previously accused of causing nutlets to drop from the trees, causes insignificant damage. Tedders believes more conservative use of insecticides could allow the

plant bugs to survive and help control aphid pests that, in some pecan-producing areas, have become insect-resistant. Synthetic pyrethroid insecticides are especially tough on beneficials that help control aphids. Use caution in applying insecticides to minimize damage to these beneficial insects.

Aphid populations sometimes appear to "explode." An unusual biological feature makes this possible. Eggs are laid in the fall, then they hatch the following spring. Small nymphs emerging from these eggs are quite unique--they are all females! They possess the ability to produce young without mating. Furthermore, the nymphs give birth to living young, completely bypassing the egg stage. These young will begin producing more young within a week!

In this way a succession of generations is produced quickly, causing leaves to be completely covered with aphids. This process continues all summer. As winter approaches, a generation of true male and egg-laying female aphids is produced again. These mate, and the process is repeated. There are variations of this cycle, but these principles explain the aphid's ability to develop large populations almost overnight.

From an article in Crop Protection Management, April 1989.

Gibberellic Acid Gets OK for Organic Production in California

Gibberellic acid has gotten a clean bill of health for use in organic table grape production in California. The California Department of Health Services has said the growth regulator meets standards for organic production set in the California Sherman Food, Drug, and Cosmetic Law. The approval comes about two months after questions began about the makeup of the substance's ingredients. The Health Services Department conducted tests on gibberellic acid and found the inert ingredient in at least one brand to be organic, falling under the guidelines for "detergents" in the California organics law.

The California Certified Organic Farmers group has pointed to the gibberellic acid debate as evidence of serious flaws in the state's organic laws and the need for establishing organic rule-making procedures and nailing down what constitutes organic production. In 1989, most organic grape growers went ahead with gibberellic acid applications despite the questions surrounding it. This serves to illustrate the magnitude of the undertaking when trying to write comprehensive, fair, and enforceable organic legislation.

Based on an article in The Packer, August 19, 1989.

Natural Agents Found to Protect Against Fruit Rot

Several naturally occurring yeasts and bacteria that protect citrus, peaches, apples, pears, grapes, tomatoes, and other fruit from storage rots have been discovered by USDA scientists. "These natural organisms are attracting commercial interest as possible alternatives to chemical pesticides now used to combat postharvest diseases caused by fungi," said Charles Wilson, plant pathologist with USDA's Agricultural Research Service (ARS). Operating from the ARS Appalachian Fruit Station in Kearneysville, West Virginia, Wilson leads a team of scientists searching for nonchemical weapons against postharvest fruit losses.

Postharvest diseases claim about a fourth of the world's fruit, Wilson said. About a third of all fruits and vegetables produced in the United States are sprayed with EBDCs, a class of fungicides, to control fungal diseases. The Environmental Protection Agency (EPA) recently proposed a partial ban on EBDCs. If alternatives to EBDCs aren't found, Wilson explained in an article in the April issue of the ARS magazine, *Agricultural Research*, commercial production of some commodities could be slowed or stopped.

One promising alternative is a strain of yeast that effectively controls postharvest diseases on citrus, peaches, grapes, and tomatoes. Named US-7, this yeast strain has been patented jointly by Wilson and Edo Chalutz, a scientist with the Institute for Technology and Storage of Agricultural Products, Bet Dagan, Israel. US-7 controls three fruit rot pathogens and fungi responsible for green mold, blue mold, and sour rot of citrus, Wilson said. He and Chalutz have signed a three-year agreement with FRM Agricultural Sciences Partnership, a binational company headquartered in Israel, to perfect the mass production and application techniques for this strain of yeast.

The research in Kearneysville is especially timely since the EPA in 1989 banned the postharvest use of benomyl, a fungicide used to protect stored apples and pears from molds. Wojciech J. Janisiewicz, another ARS scientist at Kearneysville, has isolated a bacterium from apples that completely controls blue mold, a major disease of stored apples and pears.

From an article in The Packer, May 19, 1990.

Ethylene-Blocking Products Geared to Produce

Ethylene, produce's enemy within, may have met its match. Several companies are marketing products that counteract naturally occurring ethylene production in

ripening fruits and vegetables. Called ethylene absorbers or scrubbers, they help to slow down ripening and block cross-odor contamination of products transported or stored together. The products have been on the market for several years and more suppliers have entered the picture. Only recently, though, have manufacturers targeted the produce industry as a potential market.

All the products work on the same principle. Packets of ethylene-absorbent materials, normally in pellet form, are put into a trailer or storage area where the airflow is greatest. The pellets, made of potassium permanganate and alumina, absorb and oxidize ethylene given off by ripening produce, transforming it to carbon dioxide and water. Pellets come in small packets designed for a box, in blanket form, or in a tube. Pellet use in industry is not widespread, but more shippers, particularly importers and exporters, are recognizing the potential benefits. Long-distance shipments of mixed loads of produce receive the most benefits, suppliers say.

The U.S. military has experimented with ethylene absorbers on mixed loads of produce destined for overseas installations. The Defense Logistics Agency branch in Alameda, California, has been satisfied with results. Victor Llaguno, assistant contracting officer and technical representative for the branch, said even with up to 20 commodities in one container, the absorbers have given longer shelf life to items that are ethylene-sensitive and those that produce large amounts of ethylene. Absorbers have been used on shipments to Guam, the Philippines, and Japan, up to two weeks away by ship.

Barbara Lasris, president of Air Repair Products, Inc., a Stafford, Texas, supplier of ethylene scrubbers, said the military has experimented with 22 fruits and vegetables. Although the product has been successful in the overseas shipping arena, Lasris said, some domestic shippers are experimenting with "Air Repair" and other products. TransFresh Corp., a Salinas, California, supplier of modified atmospheres for produce shipments, has found ethylene absorbers beneficial, said Rich Walton, director of marine marketing. The company has worked closely with Air Repair Products. Although there has been some question about whether absorbers perform well in modified- or controlled-atmosphere environments, Walton said they appear beneficial. No tests have directly measured the impact of the absorbers, but Walton said they're a good preventive measure for ocean shipments of several days. Temperature and ethylene-compatibility compromises often have to be made in long-distance shipments, Walton said. When this happens, he said, ethylene absorbers can remove some of the risk.

(There seems to be potential here for fresh market produce growers, suppliers and handlers who store mixed commodities in the same coolers for varying periods. It

also seems that their potential in controlled- and modified-atmosphere storage should be more directly investigated.--Chuck Voigt)

From an article in The Packer, April 28, 1990.

Chemist Develops Edible Anti-Spoil Film Coating

A USDA chemist has developed an edible film to retard ripening in fresh fruits and vegetables which, she says, is inexpensive and easily applied. "The coating extends the shelf life of produce without harming quality and allows it to be stored at normal room temperature (70° F)," said Myrna Nisperos-Carriedo, a chemist with the USDA's Agricultural Research Service (ARS). The base for the coating is commercially available oils or waxes and cellulose, but she added an emulsifier commercial blends do not have. The emulsifier keeps fat globules dispersed in water.

At the ARS Citrus and Subtropical Products Research Laboratory in Winter Haven, Florida, Nisperos-Carriedo found that the vegetable oil-emulsifier film successfully treated tomatoes, oranges, and carambolas. After 14 days of storage, only 40 percent of tomatoes treated with the emulsifier film began ripening, compared with almost 100 percent of uncoated tomatoes. She also treated a batch of tomatoes with a commercially available coating without the emulsifier. With this treatment, about 80 percent started to ripen in the same 14 days. The group treated with emulsified film also had better color and less fungal growth.

Nisperos-Carriedo was surprised to discover in tests on mature pineapple oranges that after 8 to 10 days in storage at 70° F, juice extracted from coated oranges contained up to 14 times more of the usual flavor volatiles. Volatile esters, fragrant compounds formed by the chemical combination of an acid and an alcohol, give orange juice its "fruity" taste, she said.

According to the ARS news release, fragile carambola turns an unsightly brown and shows fungal growth after about three days in normal storage. Treated with the emulsified film, the exotic fruit held up well even after eight days of storage.

From an article in The Packer, April 13, 1990.

Study Claims Gene-Modified Plants Pose No Risk to Environment

In a study released in September 1989, a National Academy of Sciences panel concluded that field-testing genetically engineered plants and microorganisms does not pose danger to the environment, if done carefully.

The *Fresno Bee* reports that the panel said genetically modified plants and microbes are not intrinsically dangerous. However, the experts said field tests should be allowed only after evaluating the effect on the environment in case a modified organism were to escape from the test area.

Robert Burris, an emeritus biochemistry professor at the University of Wisconsin and chairman of the academy's committee on evaluating gene-modified microorganisms, said about 80 modified plants and microbes had been tested in the field and no accidents had been reported. The committee said that federal agencies reviewing field-test proposals should base approval on three points: how familiar scientists are with the modified organism, how well the organism will be controlled, and the likelihood of adverse effects on the environment in the event a microorganism would escape.

The panel's conclusion was attacked by Jeremy Rifkin of the Foundation on Economic Trends, a longtime opponent of field-testing genetically engineered organisms. Rifkin called the report "irresponsible public policy," saying science has no way to evaluate risks of releasing organisms into the environment. Rifkin's organization and some other public advocacy groups have contended that field-testing runs the risk of releasing a plant or bacteria that could cause an ecological disaster.

The panel's report, however, said the major environmental risk from genetic engineering is that an altered plant would "escape" and become a weed species, or that it would pollinate wild plants and create a new type of seed.

From an article in The Packer, September 30, 1989.

Trends and Consumption of Brassicas

Brassicas, the mustard family of vegetables, contain all those things you didn't like as a child: cabbage, cauliflower, collards, broccoli, brussels sprouts, kohlrabi, kale, and mustard greens. You still may not eat a lot of these vegetables, but many people are recognizing that what their mother said is true--they are good for you!

Brassicas are a great source of minerals, particularly calcium, potassium, phosphorus, and iron; as well as vitamins A, B, and C. In addition, these vegetables contain complex sulfur compounds that are responsible for the distinctive aroma. These compounds also have recently been linked with the prevention of certain cancers.

These healthful aspects have been largely responsible for the increase in consumption of certain members of the brassicas. The most notable example is broccoli. While grown in France and Italy as early as the sixteenth century, broccoli was virtually unknown in the United States until 1923, when a test shipment of Italian sprouting broccoli was sent to Boston from California. From that humble beginning, broccoli has risen to be the number two fresh green

vegetable in terms of dollar value to the California growers, behind lettuce.

Broccoli's increase in popularity also is partly due to its versatility in diets. It can be eaten raw in salads, cooked as an entree, or used in casseroles. It can be frozen or chopped, and prepared whole or as florets. This versatility, coupled with outstanding nutritional qualities, promises to make broccoli a continued staple in the American diet. The national flap over President Bush's banning of broccoli on Air Force One has focused even more attention on this upwardly mobile brassica.

Cabbage is one of the oldest members of the mustard family. Native to the coastal areas of Europe, cabbage has been cultivated for more than 4,000 years. Also, many different forms of cabbage exist, such as red, savoy, wakefield, Dutch, and Chinese. Cabbage is quite high in vitamin C and has been an important vegetable because of its keeping ability and processed forms (sauerkraut). Consumption of cabbage has not increased, however, mostly because of the shift to the other members of the family, but cabbage has the same nutritional value. As the consumer continues to build a more healthful diet, cabbage may enjoy a resurgence.

Cauliflower or "cabbage flower" also is high in those sulfur compounds which, although thought to be therapeutic, are responsible for the sometimes strong odor. Cauliflower consumption parallels that of broccoli but has not increased at such a dramatic rate. Cauliflower makes a nice complement to broccoli, providing similar nutrition.

Brussels sprouts are said to be named after Brussels, Belgium. They also have been cultivated for many years in England. Commercial production in the United States is generally restricted to cool, coastal areas. Most of the U.S. crop comes from a narrow band along the California coast stretching from Monterey to San Francisco. Brussels sprouts have generally suffered from a poor image, often being identified as the vegetable kids hate to eat. Properly prepared, however, they have a relatively mild flavor and provide the same good nutrition as the other members of the family.

From Northrup King Company's Vegetables Today, Summer 1989.

New Varieties Return Taste to Potatoes

A new generation of potatoes is expected to surprise consumers, with purple and red potatoes and longer-lasting varieties. Elesi Products Corporation has combined the latest techniques of biotechnology with the traditional methods of agriculture to return flavor to the potato. The firm has developed an unusual assortment of potatoes, some with purple and red flesh; yellow ones that greatly reduce the need for such condiments as

butter; and russet potatoes that remain fresh on the shelf for six months.

As producers have developed more-productive, disease-resistant strains of potatoes, they have forgotten flavor, Elesi president Victor Amoah said. Amoah has been working on bettering flavor and yields since the 1970s. His new varieties were created by combining wild plant material from South America with accepted domestic species.

Testing the new varieties was completed with help of a challenge grant from the Ben Franklin Technology Center of Central and Northern Pennsylvania, Inc. Research is being conducted jointly with Paul Grun, professor of cytology and cytogenetics; Michael Orzolek, associate professor of vegetable crops; and Richard Cole, assistant professor of crop science, all at Penn State University.

Plans were to begin marketing the potatoes early this year. The first introductions are to be a dense, yellow flesh variety that already has drawn strong interest from the potato chip industry; a full-grown miniature variety for the canning industry; and a red skin, white flesh variety. In preliminary marketing sampling, Elesi's new varieties have fared well. At a potato show in Bakersfield, California, the most outstanding entries were the company's red skin, white flesh; yellow flesh russet; and two selections from the yellow lines.

In 1992 Amoah plans to introduce a true potato seed that could revolutionize potato growing. To plant one acre now, growers need about 20 hundredweight bags of tuber seed pieces. The true potato seeds are expected to cover the same acre with two ounces of seeds. (True seed varieties, however, have failed in the recent past to revolutionize the industry, so it will remain to be seen what's different this time.--Chuck Voigt)

From an article in The Packer, December 9, 1989.

Drilling A Hole Improves Frozen Corn-on-the-Cob

Simply drilling pencil-sized holes lengthwise through the center of an ear of corn can keep the quality of frozen corn-on-the-cob much closer to fresh. The hole allows corn-on-the-cob to be cooked more quickly before freezing. Rapid cooking preserves texture and flavor and more effectively deactivates enzymes in the cob that damage the kernels' flavor over time.

C.Y. Lee, Cornell University professor of food science and technology at the New York State Agricultural Experiment Station at Geneva, discovered the process while studying the chemistry of natural enzymes blamed for the bad taste in corn. The treatment preserves qualities of fresh sweet corn for months while reducing blanching times.

"It takes only three to four minutes of cooking to maintain fresh corn's sweetness and tender texture--if you eat it right away," Lee notes. "Frozen corn-on-the-cob, however, develops a cardboard-like, earthy smell after about six months, principally because it is blanched for less than four or five minutes before freezing." This is enough to deactivate the natural enzymes that cause a stale, rancid flavor over time, he said.

In commercial frozen food processing, corn-on-the-cob cooks from the outside in. By the time enough heat inactivates the flavor-robbing enzymes in the outer cob and lower kernels, most of the corn is becoming soggy and watery. Boring holes through the length of corn ears helps the corn to cook faster; blanching time is cut in half before freezing.

Taste-testing panelists have given drilled-ear corn higher marks than the conventional product. Cornell is seeking a patent on the process and working with a food processor to develop commercial-scale technology.

From an article by Roger Segelken in the New York Food & Life Sciences Quarterly 19(3):1989.

Onions Offer Health Benefits

New research indicates that onions may be much more important in our diet than we previously thought. Onions may contain compounds that have anticarcinogenic factors as well as other health benefits. Recent research at the University of California-Berkeley indicated that red and yellow onions contain high levels of quercetin, the most biologically active and common dietary flavonols. Quercetin inhibits tumor-promoting activities of many carcinogens and reduces the carcinogenic activity of several cooked food mutagens. It also seems to enhance the activity of other anticancer agents in preventing cancer cells from proliferating.

Quercetin inhibits allergic and inflammatory responses, apparently by blocking the release of histamines that cause the allergic reaction. It and other flavonols inhibit the growth of a variety of bacteria and fungi. In plants, they form part of the defense mechanism that prevents attack by microbes. Quercetin also inhibits several viral pathogens affecting humans.

From an article in The American Vegetable Grower, January 1990.

New Box Offers Stacking Strength

Westvaco Corporation reports that it is helping produce companies save millions of dollars in damaged

merchandise with its new high-compression box that offers 25 percent greater stacking strength than a standard box. Up to \$500 million in damaged merchandise can be attributed to package performance, according to the company.

What makes this high compression box so strong is its high performance linerboard, which provides substantially more compression strength per pound of fiber than conventional linerboard. This new group of linerboards is available in a variety of basis weights. No chemical strength additives are used in making these linerboards, so they are completely recyclable.

From an article in The Packer, August 5, 1989.

Uncommon Produce Cookbook Is Published

During the last decade, the range of unfamiliar fruits and vegetables has increased greatly, yet many shoppers still are hesitant to try new foods. Produce buyers nationwide have more than doubled the number of items they stock, some gathered from the wild, some imported from the tropics, and some newly cultivated in this country. The trend is partly attributable to the sophistication of well-traveled Americans.

Another cause of the explosion in the produce aisle is heightened awareness of the role that fresh fruits and vegetables play in good nutrition. People are increasing their intake of complex carbohydrates and dietary fiber while lowering their intake of fat.

Elizabeth Schneider's encyclopedic cookbook, *Uncommon Fruits and Vegetables: A Common Sense Guide*, provides nomenclature, availability, selection, storage, cleaning, preparation, and nutrition for nearly 100 new fruits and vegetables. Easy-to-prepare recipes introduce readers to "risotto with fresh sage," "chicken breast with passion fruit sauce," "sauteed shrimp and carambola," "baby eggplants with aromatic yogurt sauce," "sweet-sour yard-long beans with peanuts," "cherimoya pineapple mousse," and "golden candied kumquat tart." The book is published by Harper and Row.

From an article in The Packer, March 3, 1990.

New Publications and Proceedings

Fresh Garlic Association Newsletter. A new quarterly newsletter is available from the Fresh Garlic Association, with garlic-related news on restaurants, happenings, recipes, and health information. To receive this newsletter, send \$5.00 to the Fresh Garlic Association, P.O. Box 2410, Sausalito, CA 94966-2410.

Herb Proceedings. Proceedings are now available of the first annual meeting of the Illinois Herb Association that was held in conjunction with the Illinois Specialty Growers Convention and Trade Show, January 15 to 18, 1990. The *Proceedings* offers 100 pages of information from 15 speakers in the herb sessions at the convention. Also included are articles on culinary alliums, ginseng, shiitake, and marketing talks by Roger Barnard, lecturer in Agricultural Communications at the University of Illinois, and William H. Carlson, professor in the Horticulture Department at Michigan State University. This volume is an excellent reference on a wide variety of herb topics; it costs \$10.00, postpaid. Send orders to the Department of Horticulture, 1105 Plant Sciences Lab, 1201 South Dornier Drive, Urbana, IL 61801. Make checks payable to the University of Illinois.

Small Fruit, Strawberry, and Winemaker School Proceedings. The *1990 Proceedings of the Illinois Small Fruit, Strawberry, and Amateur Winemaker Schools* combine the papers for three schools held at Mount Vernon, Illinois, on March 6 and 7 this year. Paper topics include marketing, food safety, pest management, resources, small fruit varieties, fertilizers, and budgets for southern Illinois. The small fruits discussed include blueberries, raspberries, grapes, and strawberries. Tips for amateur winemakers are a new addition to the small fruit school.

Also included with orders for the *Proceedings* is the *1990 Illinois Commercial Small Fruit Spray Guide*, a 25-page booklet. The cost is \$11.00 for both this spray guide and the 144-page proceedings. Make checks payable to the University of Illinois and send them to J.W. Courter, University of Illinois, Route 1, Simpson, IL 62985.

New Small Fruit Crop Management Book. This book contains a complete overview of all aspects of small fruit production and management, from site selection and marketing to botany and cultivar selection. It discusses basic scientific information, environmental factors, and applied cultural recommendations. It incorporates the work of many leading authorities on each crop, including chapters by J.W. "Bill" Courter and R.M. Skirvin, both horticulture professors at the University of Illinois.

This 608-page, cloth-bound volume, edited by Gene J. Galetta and David G. Himelrick, is available by sending \$38.55 to Peggy Kahn, Prentice Hall, Mail Order Billing Department, 200 Old Tappan Road, Old Tappan, NJ 07657. Order *Small Fruit Crop Management* (81460-8).

Resources for Horticulture Farm Marketers Revised. Horticulture farm marketers can now obtain a free copy of J.W. Courter's revision of his listing of *Resources for*

Horticulture Farm Marketers. Information is provided on promotion aids, trade periodicals and associations, useful reports, newsletters, and articles on farm marketing. This 7-page list is available from Courter at the Dixon Springs Agricultural Center, Simpson, IL 62985.

1989 Yearbook of Agriculture. Farm Management: How to Achieve Your Farm Business Goals is the title of the 1989 Yearbook of Agriculture released November 29, 1989, by the U.S. Department of Agriculture. In this 336-page hardback book, more than 80 authors from the farm community, academia, and government examine how farmers plan and manage their operations.

Each member of Congress has limited free copies for public distribution. Copies are also available for \$10.00 only from the Superintendent of Documents, Washington, D.C. 20402. The USDA has no copies for sale or distribution.

Manual of Minor Vegetables; Knott's Handbook. *The Manual of Minor Vegetables*, by James M. Stephens, contains descriptions and cultural techniques for some 80 minor vegetables. To order, send a \$3.00 check made out to the University of Florida to the Florida Cooperative Extension Service, University of Florida, Gainesville, FL 32611.

Also available is the third edition of *Knott's Handbook for Vegetable Growers*, by Oscar A. Lorenz, professor emeritus of vegetable crops at the University of California-Davis, and Donald N. Maynard, professor of vegetable crops at the Gulf Coast Research and Education Center at the University of Florida. The price is \$27.50, postpaid, from Vegetable Growers, Book Department, 37841 Euclid Avenue, Wiloughby, OH 44094.

Midwestern Vegetable Variety Report. The 1989 *Midwestern Vegetable Variety Report* is now available. J.E. Simon of Purdue University compiles trials yearly from Illinois, Indiana, Kentucky, Michigan, Minnesota, and Ohio. This year, the report is a 240-page volume with trials listed by crop. The book should give a very good picture of how varieties perform under different conditions across the Midwest.

This report is available from the Department of Horticulture, University of Illinois, 1105 Plant Sciences Lab, 1201 South Dornier Drive, Urbana, IL 61801. The cost is \$7.50, postpaid. Make checks payable to the University of Illinois.

A Grower's Marketing Guide; Alternatives to Insect Management. *A Grower's Guide to Marketing Fruits, Vegetables, and Herbs in Illinois*, Circular 1300, is now available from county Extension offices and from the

University of Illinois Office of Agricultural Communications and Education. This guide contains a wealth of information for the novice or experienced grower. It covers storage, pricing, handling, packaging, and quality standards of various specialty crops. Appendices include lists of major produce buyers in St. Louis, Chicago, and smaller Illinois markets; food processors located in and near Illinois; and average net weights for different packaging containers. Cost is \$5.00. Send orders to the Office of Agricultural Communications and Education, 69-R2 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801. Again, make checks payable to the University of Illinois.

There is also a new *Alternatives in Insect Management* series. These include C1295, *Microbial Insecticides*, cost \$1.00; C1296, *Botanical Insecticides and Insecticidal Soaps*, cost \$2.00; C1297, *Insect Attractants and Traps*, cost \$2.00; and C1298, *Beneficial Insects*, cost \$2.00.

Guide to Everybody's Favorite American Food Festivals

The Rio Grande Valley Onion Festival was held this year for the first time in Westlaco, Texas, on April 21. Don't cry if you missed this year's slate of onion-promoting activities, as this is planned to be an annual event.

The International Horseradish Festival features various activities, all related to growing, harvesting, eating, or otherwise promoting horseradish. The festival is scheduled yearly on the first Saturday in May in Woodland Park, Collinsville, Illinois.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

The National Cherry Festival. You'll want to stay at least 40 feet away from the pit-spitting champion. This event is being held July 7 to 14 this year in Traverse City, Michigan.

The Gilroy Garlic Festival. Each year, 150,000 garlic lovers gather here to consume more than 3,500 pounds of the pungent bulb. This year the dates are July 27 to 29, in Gilroy, California.

The Enchilada Festival. The world's largest enchilada--six feet in diameter--is the centerpiece of this celebration, held October 5 to 7 in Las Cruces, New Mexico.

The Okra Strut. A police officer once forced down two pounds of boiled okra in the eating contest. "I think he got real sick," one of the townspeople recalls. The strut will be held October 6 in Irmo, South Carolina.

The Circleville Pumpkin Show. Half a million people sample Circleville's pumpkin dishes and stare at their megapumpkins each fall. October 17 to 20 are the dates for this year, in Circleville, Ohio.

The Spinach Festival. Only the spinach capital of America would erect a permanent statue of Popeye in front of its city hall. The spinach festival is in Crystal City, Texas, from November 9 to 11.

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



September is here, and I'm not ready for fall. All season I've waited for the dry spell that always seems to show up, even in wet seasons, to remind us that nothing is forever. Maybe it will come during fall harvest and give us a chance to get field work done quickly. I won't hold my breath, however.

Now that sufficient rain has dampened the intense interest of the last two years in quantity water-use issues, it's time to focus on water quality issues because leaching and runoff have been considerably greater this year than in other recent years. Planning to reduce individual contributions to ground and surface water contamination makes sense now, before government agencies move with further regulations. The

bottom line is that we rely heavily on high quality water, so we have a vested interest in avoiding contamination.

As this season winds down, we can examine new and different crops and systems that might fit our needs next year or in the future. New solutions to old problems become more important as conventional practices no longer work, or are legally blocked from use. Marketing has always been a challenge, and this will not diminish in the age of designer vegetables.

If anyone has announcements, concerns, or interests that need to be addressed in this newsletter, or if you have problems with topics that are discussed, feel free to write or call with suggestions. Be gentle, though. My address is: 208 Vegetable Crops Building, 1103 West Dorner Drive, Urbana, IL 61801, (217)333-1969.

Vegetable Compound Effective Against Cancer

Americans are urged to include more fruits and vegetables in their diets and not to rely on vitamin and mineral pills to improve their chances of avoiding cancer. The research of Zbigniew Walaszek, PhD., is a good example of why eating nutritious food, rather than taking supplements, is so important.

Walaszek, a biochemist at the University of Texas M.D. Anderson Cancer Center, has isolated a substance from vegetables that seems to interfere with cancer development, particularly breast cancer, in laboratory animals. The compound is called glucarate, and it is not sold in any vitamin pill in any pharmacy. It is found naturally in cruciferous vegetables such as broccoli and Brussels sprouts, in bean sprouts, and in other plant foods.

Based on his earlier research with a substance similar to glucarate, Walaszek suspected that the glucarate in food might prevent carcinogens and other harmful substances in our systems from causing cancer. With a grant from the American Institute for Cancer Research (AICR), Walaszek sought to find if this was the case and, if so, how this occurred.

He confirmed that glucarate in food seems to prevent known carcinogens from initiating the cancer process. Glucarate also seems to prevent the formation of certain compounds that promote tumor growth in the lungs, skin, liver, colon, and especially the breast. Whether glucarate is given to laboratory animals before or after their exposure to the cancer-causing chemicals, glucarate substantially slows tumor growth.

In another important related discovery, Walaszek is beginning to learn how glucarate works. It appears to profoundly alter the balance of hormones within cells. Certain hormones regulate the growth of both normal cells and tumor cells. Like a chain reaction, it may turn out that glucarate regulates natural hormone levels, and these hormones in turn regulate cell growth. This gives glucarate another way of interfering with cancer development.

Putting the results of Walaszek's studies together, it seems that glucarate may some day be used to treat cancer. It also may be used as part of a cancer prevention program, especially for people with a family history that places them at a higher risk for developing certain cancers.

Glucarate is a good example of the value of eating lots of fruits and vegetables rather than taking vitamin supplements. Fruits and vegetables are good sources of beta-carotene and other vitamins, minerals, and fiber; these are substances that may lower cancer risk. There probably are many other yet-to-be-discovered



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

substances in plant foods that could help prevent cancer. That's why Americans are urged to eat more fruits, vegetables, and whole grains, rather than take specific nutrients in pill form.

From an article in the AICR Newsletter, Spring 1990, Issue 27.

Illinois Scientist Calls for Ban on Atrazine

Traces of atrazine have shown up in a number of midwestern drinking water wells, prompting an Illinois researcher to call for a ban on the herbicide. "I don't think atrazine is a great health risk, but it is the number one contaminant," said Allan Felsot, associate professor, Center for Economic Entomology, Illinois State Natural History Survey, at the 1990 Illinois Crop Protection Workshop.

A U.S. Environmental Protection Agency compilation of groundwater monitoring throughout the nation shows 77 pesticides have been detected in 39 states. All detections were limited to herbicides, with atrazine showing up in 9 percent of the total wells reported. The frequency of detection varied depending upon agricultural practices and rainfall events, Felsot noted.

The U.S. EPA recently reclassified atrazine as a restricted-use chemical. Although some may think that banning atrazine will not solve the problems linked to the corn herbicide, others believe that the proposal has some merit toward solving groundwater troubles. Orlo Ehart, manager of issues and policies for Ciba-Geigy's Agricultural Division, said he did not see anything radical about Felsot's proposal. "We have to accept that what we do on the surface of the ground has an effect on the groundwater," Ehart said.

A number of factors are believed to affect pesticide leaching: very permeable soils, high rainfall, and shallow, unconfined aquifers. These factors somewhat explain statistics that indicate pesticide detections in 20 to 30 percent of public water well supplies in Iowa, while only 3 percent in Illinois were contaminated. "Pesticide contamination is very dynamic," Felsot said. "It fluctuates through the year."

Felsot contends that pesticides have always been in the groundwater, and that any pesticide, not just herbicides, has the potential to move into the groundwater. Where these contaminants actually come from is the topic of much debate. Sources are generally divided into two classes: point source and nonpoint source.

Facilities that handle chemicals on a commercial basis are usually defined as being a point source. Routine pesticide use, application to soil or crops, is generally accepted as the definition of a nonpoint source. This definition, however, does not account for on-site handling and mixing. Both Ehart and Felsot agree that these sources must have exact definitions which take all circumstances into account before groundwater contamination can be tackled.

From an article by Marcie Gerriets in Illinois Agri-News, March 30, 1990.

Pesticide and Soil Properties Determine Leaching Potentials

Pesticide properties along with the chemical and physical properties of soils determine the likelihood of a given pesticide being leached below the root zone in a particular soil. Pesticide half-life, soil sorption index (a measure of the attraction between the pesticide and soil particles), and water solubility have been used to predict the leaching potentials for commonly used agricultural pesticides.

Pesticides, including fungicides, herbicides, and insecticides, have been ranked as having large, medium, small, or total use leaching potentials. Pesticides ranked "total use" will probably never be leached, regardless of the soil type to which they are applied. Table 1 shows the half-life, soil sorption index, and water solubility values for some commonly used corn herbicides along with their predicted leaching potentials.

Inspection of the half-life, soil sorption, and water solubility values for two of the foliar-applied herbicides in Table 1 demonstrates the importance of the soil sorption index in determining leaching potentials. Keep in mind that pesticides with high Koc values have a stronger attraction to soil particles than pesticides with low Koc values. Although paraquat (Gramoxone Extra) has a long half-life (3,600 days) and is very water soluble (1,000,000 ppm), it has a high Koc value (100,000) because each Gramoxone Extra molecule has two positive charges and is very tightly bound to negatively charged clay and organic matter particles in soil. As a result, it has a small leaching potential. On the other hand, dicamba (Banvel), which has a short half-life (14 days) and high water solubility (800,000 ppm), has a very low soil sorption index (2) because Banvel molecules are negatively charged and are not attracted to negatively charged clay and organic matter particles. As a result, Banvel has a large leaching potential.

Individual soils also are ranked as having high, intermediate, or nominal potential for pesticide loss through leaching or movement through the soil profile. The pesticide and soil rankings can be used in a "potential pesticide loss to leaching matrix" (Table 2) to determine the potential for pesticide leaching on a given soil.

If alachlor (Lasso), which has a medium leaching potential, is applied on a soil with a high soil leaching potential (sandy or gravelly soil with low organic matter content), the overall leaching potential is Potential 1. This means that Lasso has a high probability of being leached below the root zone in that soil. Substituting butylate (Sutan+), which has a small leaching potential, in place of Lasso would reduce the overall leaching

potential to Potential 2. Potential 2 indicates that the herbicide has the possibility of being lost to leaching. If Lasso is applied to a soil with only nominal leaching potential, the overall leaching potential is Potential 3, which means there is a very low probability of leaching. Lasso could be used with little risk to groundwater quality in this situation.

Although herbicide labels and weed control recommendations are somewhat site specific, it is clear that weed control recommendations will become even more site specific in the future. In those situations where the risk of surface or groundwater contamination with herbicides exists, alternative herbicides or other weed

Table 1. Pesticide Properties and Predicted Leaching Potentials

Herbicide	Half-life days	Soil sorption (Koc)	Water solubility (ppm)	Leaching potential
<u>Soil Applied</u>				
atrazine	60	160	33	Large
*cyanazine (Bladex)	20	168	171	Medium
simazine (Princep)	75	138	3	Large
metolachlor (Dual)	20	200	530	Medium
*alachlor (Lasso)	14	190	242	Medium
pendimethalin (Prowl)	60	24,300	less than 1	Small
butylate (Sutan+)	12	540	45	Small
<u>Foliar Applied</u>				
dicamba (Banvel)	14	2	800,000	Large
Bentazon (Basagran)	10	35	2,300,000	Medium
*bromoxynil (Buctril)	14	1,000	50	Small
*paraquat (Gramaxone)	3,600	100,000	1,000,000	Small
glyphosate (Roundup)	30	10,000	1,000,000	Small

*Restricted-use pesticide

Table 2. Matrix for Potential Pesticide Loss to Leaching

Soil leaching potential	Pesticide Leaching Potential			
	Large	Medium	Small	Total Use
High	Potential 1	Potential 1	Potential 2	Potential 3
Intermediate	Potential 1	Potential 2	Potential 3	Potential 3
Nominal	Potential 2	Potential 3	Potential 3	Potential 3

control practices should be used. A thorough understanding of properties that determine an herbicide's potential for contaminating water supplies and soils is basic to responsible herbicide use.

From an article by R.R. Hahn, Department of Agronomy, Cornell University, in Vegetable Notes, May 24, 1990.

Biopesticides Could Halve Chemicals

One of the first of a new wave of "environmentally friendly" biopesticides is the subject of a major new marketing drive. Safer, Inc., Newton, Massachusetts, announced its marketing push aimed at produce in a May 3 press conference. The firm is marketing its pesticide products under the brand name Safer. In addition, it will establish what may be the nation's first national information clearinghouse operated by a pesticide producer to link retailers with growers who are reducing their chemical pesticide use.

A host of biopesticides will soon be on the market, said Tim Zink, vice-president of the firm's commercial and agricultural division. They will have differing modes of action, but will be effective and much safer for consumers and the environment. "The next five years are going to be exciting," he said. "We are on the verge of the first new agricultural revolution in 30 years. We want to show growers something positive--how they can cut pesticide use by 50 percent and be proud of it."

Safer pesticides are based on naturally occurring fatty acids and designed for use in an integrated pest management program reducing chemical pesticide use. "Growers should be aware that fatty acid-based pesticides are naturally developed, completely biodegradable, and, most importantly, contain no toxic ingredients," Zink said.

The fatty acids are derived from animal or vegetable sources. When sprayed on crops, they erode into the cuticle or outer shell of soft-bodied insects, causing rapid death, according to Paul Goodspeed, manager of Safer's international division in Toronto. He said the pesticide does not harm hard-shelled insects or other species. "Safer is a nonsystemic contact compound with little residual activity, at one time a drawback," Goodspeed said. "Public perception has changed," he added. "Safer breaks down rapidly and leaves no residue, which is what people want. On the down side," he said, "this means more spraying and more labor." Safer attacks mature insects and has no effect on the eggs. For this reason, the company sees Safer as part of an overall integrated pest management program.

Goodspeed said many growers are looking for this kind of transitional product that can be used along with chemical pesticides, but that reduces the need for

chemicals. "It's hard for commercial growers to walk away from chemical pesticides," he noted.

Of biopesticides, Jay Feldman, director of the National Coalition Against the Misuse of Pesticides, an environmental group, said, "These products tend to be on the safer end of the spectrum. They have gained the respect of the environmental community." He added that fatty acids generally are categorized as safe, but he could not speak to their effectiveness.

Safer is setting up a national clearinghouse based in St. Louis to bring together grocers who want to sell low-pesticide produce with growers who can deliver it regularly. This pesticide campaign is the company's first move into the commercial retail agricultural market. "In the early days, there was not much interest in these environmentally safe products," Goodspeed said. "Now the demand may overtake us." Because cost is a factor, he said that the company is aiming the product at high-ticket fruits and vegetables rather than low-cost crops such as corn and soybeans. Goodspeed described Safer as "biorational," which he defined as "safe, natural, effective, and reasonable to use."

From an article in The Packer, May, 1990.

Scientists Discover Natural Bug Killer

Farmers someday could spray genetically engineered fungi as an alternative to chemical insecticides, according to two U.S.D.A. scientists in Peoria. Timothy Leathers and Subhash Gupta of the Northern Regional Research Center have identified enzymes secreted by insect-killing fungus. "If genes that make the enzymes could be put into other fungi, scientists could produce a pest control designed for certain insects," Leathers stated.

"Chemical pesticides are very effective," Leathers said last July. "We see the selling point (of fungi) as the safety aspect. I think there is a real growing concern about chemical pesticides and farm worker exposure, produce (residue), and groundwater contamination."

The scientists are experimenting with a fungus that attacks 200 insect species. Some fungus enzymes appear to be potential controls for insects that attack corn, wheat, cabbage, and other crops. Both the enzymes and the common soil fungus occur naturally. The enzymes break down the insect's skin, which lets the fungus enter, multiply, and consume the bug. "That is an attractive point of fungi insect control," Leathers said. "Insects don't have to eat the fungi--they can be killed by touching it."

Fungi haven't been used for insect control because they are slow and inefficient, which made identification of the right enzymes important, he said. By knowing the

right enzymes, scientists could genetically engineer the fungi to make them work faster and kill insects they don't normally attack. Fungal spores then could be sprayed onto plants, Leathers explained.

The fungus hasn't been field tested. Leathers and Gupta are still studying the basic mechanisms of how the enzymes work. In some lab tests, the fungal spores killed half of the targeted insect species within four days.

Besides the genetic engineering, a company would have to mass produce the fungi before the product would be economically viable. Leathers said it will take time to find a method, but it is "very do-able" because there are precedents for fungi mass production.

Since the discovery was first announced, several companies have expressed interest, Leathers said. Members of the Biotechnology Research and Development Corporation will, however, have first crack at insect-killing fungi. The corporation, a consortium of companies, universities, and the Peoria laboratory, has funded the scientists' research.

From an article by Kay Shipman, in FarmWeek, July 16, 1990.

Biological Insecticide Now Available Nationally

Cutlass biological insecticide from Ecogen is now available nationally for use on a variety of vegetable crops. Cutlass contains naturally occurring strains of *Bacillus thuringiensis* (B.t.), a bacterium fatal to caterpillar-type insects but nontoxic to humans and animals. The Environmental Protection Agency has cleared the product for use on broccoli, cabbage, celery, horseradish, lettuce, radishes, swiss chard, bok choy, brussels sprouts, cauliflower, collards, kale, parsnips, and turnips for control of armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, diamondback moth, and imported cabbageworm. Call (215)757-1590 for more information.

From an article in Crop Protection Management, May 1990.

How Naturally Occurring Beneficial Insects Can Help You

Almost all creatures have natural enemies. This is just as true in the insect world as elsewhere. This statement has three important implications for your farming operation:

1. All the insects in your crop are not harmful; many can be helpful if given the chance to "do their thing."

2. You can profit from understanding the role and capabilities of these beneficial insects. It's essential to know the good ones from the bad ones and recognize conditions under which they may be helpful.
3. You need to understand the effects that insecticide sprays may have on beneficials. There are times when you have no choice—you simply must spray to protect a crop—but some insecticides reduce populations of beneficial insects, leading to outbreaks of secondary pests and a resurgence of target pests. It's essential to monitor populations of pests and beneficials to make sound decisions about timing insecticide applications.

The two categories of beneficial insects are parasites and predators.

Parasites. Tiny wasps and flies comprise a large part of this group, but some other insects are included, too. Adult parasites deposit their eggs in, on, or close to their victims (hosts). As the eggs hatch, the juvenile parasites obtain their food by feeding on the hosts. Parasites seldom kill hosts immediately. Instead, the hosts gradually die as parasite feeding continues. Parasites are smaller than their hosts.

Predators. Many insects function as predators of other insects. Immature and adult predators seek out and devour their victims. A predator may consume from a few to many insects as it develops. Predators generally are larger than their prey, which they kill outright.

Let's take a look at some examples:

There are thousands of parasitic wasps and flies. Many of them have no common name; they are known only by their scientific names. Ichneumon flies and braconids are two large families of parasites.

Braconids parasitize a wide range of insects, including aphids. One braconid, *Apanteles glomeratus*, is a parasite of the imported cabbageworm, cabbage looper, and caterpillars of other butterflies and moths. The female parasite deposits 30 to 40 eggs within the body of each caterpillar. The eggs hatch in three or four days, and the developing larvae feed on the host's fat and other body materials for eight to twelve days as they mature.

Some parasitic wasps deposit their eggs within the eggs of their victims. As the wasp larva emerges, it feeds on and kills the host's egg. Predator insects include lacewing flies, assassin bugs, minute pirate bugs, lady beetles, and many others. The larvae of lacewing flies are extremely effective predators. They feed on aphids, thrips, mites, young corn earworms, and other small, soft-bodied insects or eggs. Minute pirate bugs feed on insect eggs and newly hatched larvae as well as spider mites and thrips.

Here are some additional points about beneficial insects:

Some beneficials are very host-specific. They are effective on one pest but may have little or no effect on another closely related insect.

Beneficials tend to be more susceptible to insecticides than pests. Plant-feeding insects usually have enzyme systems that metabolize natural plant toxins and these same enzymes can help them detoxify some petroleum-based insecticides. The beneficials, on the other hand, may not have such highly developed enzyme defenses.

Some insecticides are "easy" on beneficials. For example, systemic insecticides require that an insect feed on the plant to come in contact with the toxin. Also, microbial insecticides such as those containing the bacterium *Bacillus thuringiensis* are pest-specific and do not harm beneficial insects.

From an article in Crop Protection Management, May 1990.

USDA Researching Machine to Dispose of Farm Waste Water

A mechanical device to dispose of waste water after farm sprayers are flushed to rid them of pesticides is in the works. The USDA's Agricultural Research Service says the portable treatment uses ozone gas and soil microorganisms to break down unused pesticides before disposal. The goal is to turn unused pesticides into safe carbon dioxide instead of converting them into toxic compounds produced by burning.

Ciba-Geigy Corp., Greenville, North Carolina, has entered into a cooperative agreement with USDA to continue the procedure and device development to see if it can handle larger volumes of pesticides. The treatment was originated at Beltsville, Maryland. Officials a year ago tested the first device with 150 gallons of what they called "typical pesticide soup," consisting of detergent and water used to clean corn herbicides from spray tanks.

Within three days, the treatment destroyed between 46 and 96 percent of the chemicals used in the sprayer. Pesticides are resistant to microbial digesting, but the ozone treatment oxidizes and makes them more biodegradable.

This technology is far from the commercial stage, although Ciba-Geigy's director of new technology and basic research said he envisions the device one day being transported from farm to farm for treatment.

From an article in The Packer, December 9, 1989.

Neem Tree Providing Natural Defense

Botanic or natural insecticides are experiencing a surge in popularity because they're perceived as being less harmful to the environment. As a result, researchers from industrialized countries are taking an increased interest in the neem, a tropical tree that grows in dry, stony soils. The neem, native to India and Burma, now is scattered over many dry regions. The tree is well-known for properties that repel or kill insects and for its medical benefits.

Various parts of the tree provide complex molecules difficult to produce artificially. Azadirachtine, a chemical extracted from the seed of the fruit, repels insects when applied to the surface of leaves or inhibits the growth of pests when it's eaten. The chemical can also affect insect fertility by reducing the number of eggs laid by females.

From an article in The Packer, December 9, 1989.

Satellite Link Connects Vegetable Buyers

Ray Nykaza has a lot of zucchini he'd like to get rid of, and a new satellite marketing system may connect him with just the right buyer. A pilot project of the Illinois Farm Bureau's Commodity Division links buyers and sellers through the organization's electronic news system FarmDayta.

Nykaza, who operates a pick-your-own produce farm in Chicago Heights, became interested in finding a marketing tool that would put buyers and growers in touch after attending a marketing meeting in Pennsylvania. He approached the Cook County Farm Bureau with the idea, and nearly five years later the specialty producer's idea came to fruition and is now the statewide pilot program. "We've been pushing it for years," he said. "We thought it would be a great tool--people with excess crops could list them and people who need crops could do the same." About 25 Illinois farmers are participating in the pilot program.

In the past, these growers could subscribe to a newsletter service to get prices and market information. Now, they can simply consult a computer screen in their home or business to find out the going price for their produce. In addition, the growers can call a toll-free number to list their name, telephone number, and information about the crops they are buying or selling. It is their responsibility to make contacts for purchasing or selling produce.

"Sometimes you're short or in between crops. This way you can find what you need on the FarmDayta system," Nykaza explained. So far, there have not been a lot of listings, he added.

Jim Goebbert, a producer from South Barrington, said that both growers and buyers would benefit from dealing directly with each other. "We could bypass the South Water Street Market (in Chicago), save on trucking, and not have to pay commission," he explained.

Nykaza believes there is a future for this program. Large roadside markets, not just growers, could use the system to buy produce. In addition, the Chicago-area farmer would like to see more producers involved with the marketing program. "In order for this thing to work, growers from the deep south of Illinois and from other states have to get involved," he said.

Participants in the pilot project are paying \$100 to receive the information during the six-month program.

From an article by Marcie Garrietts, Illinois Agri-News, August 3, 1990.

Looks Outweigh Content for Consumers

Roberta Cook, University of California Extension economist, said consumers are reasonably confident with food safety, despite underlying concerns sparked by March 1989 reports about Alar on apples. Cook, a specialist in fresh produce marketing, has followed consumer trends since the Alar incident. She shared some of her observations last April at the California Table Grape Commission's reorganizational meeting.

"Labeling organic produce calls attention to the food safety issue," she said, "causing some grocers to react negatively to such marketing techniques. Retailers want to see growers attain the no-detectable-residue levels, but without labeling the product," Cook said. "Grocery stores want such standards for their own internal assurance," she added.

Two months before it was announced that Alar, a growth regulator for apples, could cause cancer, 81 percent of consumers polled said they were "mostly confident" their food was safe, Cook said. "Consumer confidence dropped significantly afterwards".

Scientists, on the other hand, cite microbiological contamination as the number one food safety issue. Each year, 9,000 deaths are linked to improper food handling in the home. "These could be prevented if we were not putting so many of our resources into the area of pesticide residues," Cook said.

"The public equates food safety hazards with pesticide residues." Current opinion polls reinforce such facts. How people respond to a survey is not how they buy, Cook said. While consumers polled stated they are influenced by product contents, no changes in their buying habits were observed. "Appearance is the consumer's number one concern, followed by freshness and taste," Cook said.

Organics account for less than 2 percent of the produce department's total sales, Cook said. Gross profits are smaller. Because retailers are dealing with a high-priced commodity to begin with, the markup cannot be in the same range as standard produce. The price would be too high, further reducing consumer demand. "Organic sections generally are not profitable," Cook said. To reduce inventory and get some of their money back, grocers have shifted the produce into the conventional sections.

One year after the Alar scare, stores involved with pesticide-free produce have dropped in number. One of the most notable has been Sacramento-based Raley's Supermarkets, citing decrease in consumer demand. "People are just not willing to pay a premium in the conventional channels," Cook said. High prices and inconsistent quality and supplies have limited organics' success, she added. Nationally, the organic industry is a \$210 million business involving 4,500 growers, or 0.2 percent nationally.

Dennis Parnagian of Fowler Packing said much labeling done by grower-shippers is at retailer's request. Much of this is a supermarket strategy, he said, adding he believes grower-shippers ask retailers what they can do to help sell the produce. "I don't think growers are putting the labels on because they have a great desire; rather, retailers are questioning and asking for them."

While consumers increasingly show renewed confidence in their produce purchases, Cook said, the level remains lower than the 81 percent recorded in January, 1989.

From an article in The Packer, April 28, 1990.

Favorite Ethnic Foods

Americans have their favorites when it comes to ethnic foods—Chinese, Italian, and Mexican cuisines lead the list, according to a National Restaurant Association study. "The Market for Ethnic Foods" was released in February by Association President Harris "Bud" Rusitzky.

The association surveyed a nationally representative sample of 635 adults about their behavior and attitudes toward 19 ethnic cuisines available at restaurants. Respondents were asked whether they had ever tried these cuisines and if they had done so in the past month. "Approximately three-quarters of Americans have eaten Chinese, Italian, and Mexican foods in restaurants," Rusitzky said. "When we asked respondents at what ethnic restaurants they had eaten in the last month, more than 40 percent named the same three—only the order changed, with Italian ranking first, followed by Chinese, and then Mexican." The Italian segment excluded pizza restaurants.

The study also revealed a second tier of preference for ethnic restaurants. Between 25 and 50 percent of American adults said they have tried French, Spanish, German, Japanese, Greek, and Latin American food, in that order of

frequency. When asked about eating these ethnic foods at restaurants during the last month, the positive responses fell to 6 to 10 percent, and the order changed. Greek food moved to the top, followed by French, Spanish, Japanese, German, and Latin American.

The third tier of preference included cuisines appreciated by only a select few--Indian, Caribbean, Eastern European, Middle Eastern, Korean, Thai, Vietnamese, Scandinavian, Russian, and African. Five to 18 percent said they had tried these foods at restaurants. Only 1 to 3 percent said they had eaten them in the past month. Less than 4 percent of those who had never tried foods in the third tier expressed an interest in doing so.

Rusitzky said French, Spanish, and German cuisines showed potential among consumers who hadn't tried them. "Unlike many of the cuisines in the 'third tier,' French, Spanish, and German cuisines derive from Western European cultures with which Americans are generally more familiar."

Rusitzky predicted that as new ethnic restaurants develop, more attention will be paid to areas that survey respondents indicated have been lacking in the past--increased strategies to attract children, increased education about various ethnic foods, and a new emphasis on ethnic desserts.

For more information on the survey, contact Anne Papa at the National Restaurant Association, 1200 17th St., NW, Washington, DC 20036 (202)331-5938.

From an article in The Packer, May 19, 1990.

As ethnic restaurants become ever more popular, they become increasingly good markets for all types of specialty produce. While the overall trends suggest a few of the more popular ethnic origins, the best for any grower to investigate are those nearby. This is a niche that often has to be supplied from distant markets, when local producers could just as well handle many requests, at least on a seasonal basis. Check out what is going on in your area for possible opportunities. (C.E.V.)

Wisconsin Looks to Tuber's Roots

University of Wisconsin-Madison scientists are sending potatoes back to their roots. Native to the Andes mountains in South America, many wild potato species carry resistance to diseases, insects, and drought. Plant breeders incorporate these qualities into domestic potatoes by crossing them with wild species.

Now, university geneticists are returning the favor by sending some improved potato varieties to the International Potato Center near Lima, Peru. The center tests the varieties and distributes tubers for planting in many

developing countries, plant geneticist Stan Peloquin said. As a result, he noted, some countries have greatly increased potato production.

A principal source of proteins and carbohydrates for many people in the Third World, potatoes provide the best balance of the eight amino acids humans need. The crop is also one of the easiest to improve genetically because 150 to 200 species of potatoes exist in the world, Peloquin said, adding that genetic material in wild potatoes can be easily incorporated into cultivated potatoes. "I can't think of any characteristic we need in cultivated potatoes that we aren't able to get through breeding with wild species," he said.

However, breeders must overcome one problem--most wild potatoes contain 24 chromosomes while domestic varieties carry 48 chromosomes. Because their chromosome counts differ, wild potatoes don't readily cross with domestic varieties. Peloquin has developed a method to raise domestic potato plants with half their normal chromosome number. He can then cross these domestic potatoes with pollen from the wild potato. The resulting hybrid carries two sets of chromosomes and genetic information from the wild and domestic parents.

Because potatoes in most developing countries require short days to develop tubers, while North American varieties develop tubers under long days, Peloquin next crosses the hybrid with a native variety. The resulting 48-chromosome potato is vigorous, high-yielding, and well-adapted to tropical areas.

Some valuable spin-offs are emerging from the research. University plant pathologist Luis Sequiera has incorporated resistance to bacterial wilt from wild species into cultivated potatoes. Bacterial wilt is a particularly devastating disease in tropical areas.

The research will allow some Third World areas to plant potatoes from true seed. Because many local potato tubers become infected with crop-destroying viruses in tropical areas, growers must buy clean potato tubers from the Netherlands for planting. This represents 50 to 80 percent of the growers' total production costs. Planting potatoes from true seed provides growers with virus-free material and lowers costs greatly. Some areas in China and several Southeast Asian countries have benefitted the most from this research, according to Peloquin.

From an article in The Packer, December 9, 1989.

Straw Mulch for Suppression of Colorado Potato Beetle

The Colorado potato beetle (C.P.B.) is a serious pest of potatoes grown on the Eastern Shore of Virginia. Early planting of potatoes to take advantage of high market

prices contributes to potato beetle crop damage because the early emergence of potato plants coincides with peak emergence of overwintered C.P.B. adults from the soil. Previous studies demonstrated that early season defoliation by the C.P.B. significantly reduced tuber yields. Because C.P.B. populations have developed high levels of insecticide resistance, alternative control practices are needed to reduce dependence on foliar insecticide applications.

Results from experiments in no-till tomatoes indicated that potato beetle populations were reduced in the no-till fields compared with conventional-tilled fields. It was hypothesized that the nonhost vegetation in the no-till fields acted as a barrier to host location by C.P.B. adults. Concurrent studies done in 1987 indicated that the application of straw mulch also may act as a barrier to host location by the C.P.B. (unpublished data).

To further investigate these results, field experiments were done in 1988 to monitor C.P.B. population development in potatoes with and without straw mulch. Plots consisted of twelve 30-foot-long rows with 3-foot spacing between rows. The plots were randomized in four blocks, each block containing one plot with straw mulch and one with no mulch. Enough straw (approximately 7 bales per plot) was used to provide a 3 to 5 inch layer over the soil just before plant emergence.

Colorado Potato Beetle Population Density and Tuber Yields in Potato Plots With and Without Straw

Treatment	Mean No. Potato Beetles/Stem				Tuber Wt. (Cwt/A.)
	Egg masses	Small larvae	Large larvae	Adult	
Mulch	0.91	6.81	4.76	0.58	192.8
No Mulch	1.63	15.30	17.94	1.06	119.0

Number of potato beetle adults, egg masses, and small (first and second instar) and large (third and fourth instar) larvae were counted weekly on 20 randomly chosen potato stems per plot. Soil temperature and moisture also were monitored weekly. Numbers of C.P.B. overwintered adults, egg masses, and larvae were significantly lower in the mulch plots, compared with the no-mulch plots when peak populations of each life stage were present.

Soil temperature and moisture levels were more favorable for potato growth in the mulch plots. Soil temperature during the growing season averaged 3.6 degrees cooler in the mulch plots than in the no-mulch plots. Early studies in potatoes demonstrated that soil temperatures above certain limits can reduce potato yields. Soil moisture carrying capacity (as measured by tensiometers) was significantly greater in the mulch plots

compared with the no-mulch plots on all sample dates. It is likely that the above factors collectively contributed to the higher tuber yields in the mulch plots compared with the no-mulch plots.

We believe that the movement of C.P.B. adults is inhibited by the physical presence of the straw and possibly the lower soil surface temperatures in the mulch plots. This may explain why early season infestation of overwintered adults and subsequent development of larvae is reduced in the mulch plots compared with the no-mulch plots.

Is the use of straw mulch in potato production cost effective? The additional profit that could be realized with increased tuber yield may justify the use of straw mulch by commercial potato growers. At an average price of \$8/cwt., the higher yield of Grade A tubers in the mulch plots would correspond to an increase of over \$600 per acre over the value of grade A tubers in the plots without mulch. This figure does not account for the probable reduction in weed and potato beetle control costs and the addition of soil organic matter associated with the use of straw mulch.

The use of straw mulch would be most cost effective in a situation where growers rotated potatoes with a cover crop suitable for mulch (wheat, rye, vetch, etc.) or grew the cover crop in fields adjacent to potatoes. The cost of purchasing and transporting straw would be eliminated because the straw could be harvested, baled, and stacked next to the field in which potatoes were to be planted the following spring. The use of mulch also is compatible with the recent emphasis on sustainable agriculture because pesticide inputs are reduced and soil condition is improved (reduced erosion and increased soil organic matter). The first use of straw mulch in U.S. potato production dates back, at least, to the early 1900s. With the increasing problem of insecticide resistance, it may be beneficial to re-examine some of the older cultural methods for control of serious insect pests like the Colorado potato beetle.

Report of work done by G.W. Zender, Entomologist, Eastern Shore Agricultural Experiment Station, Painter, VA, and J. Hough-Goldstein, Department of Entomology, University of Delaware, Newark, DE. Taken from Cornell Vegetable Notes, December 7, 1989.

Cover Crops Benefit Vegetable Plantings

Some vegetable growers are increasing their use of cover plantings to suppress weeds and eliminate stand reductions in vegetable crops. According to Michigan State University research specialist Bill Chase, tomato and asparagus growers in his state are seeding covers of rye and barley in the fall and early spring and then using herbicides to kill them off just prior to the start of the cropping season.

The technique, which Chase says can be adapted to most parts of the U.S., improves stands by providing seedlings with a cover against wind and reducing the need for additional herbicides by suppressing weeds during the off-season. "When we kill the cover, it provides a mat of residue that helps break the wind at the surface," says Chase. "It's this wind that lifts sand and soil particles which strike and injure young plants."

A cover killed with the right herbicide at the right time can provide wind protection all season, from the time when vegetable plants are young and vulnerable to weeks later when fruit is in the ripening stage. "We like to see a cover established in the fall or early spring to begin competing against weeds as soon as possible," he says. "We then like to see it killed back before it grows too tall and produces too much residue which can interfere with seedbed preparation and crop development."

"In just the last two or three years, postemergence grass herbicides that make cover crops possible have become available for use in vegetables," says Dr. Bernard Zandstra, Michigan State University horticulturist. "Thanks to these new products, we now have a whole new way to raise vegetables." Choice of herbicide and when to apply it depend on a host of factors including type of cover to be killed, amount of seedbed preparation planned, and the vegetable to be planted, he says. "With many small-seeded vegetables, it is difficult to plant through cover residue so that some type of tillage is usually required before planting."

Chase says cover crops used for transplant tomatoes in Michigan are killed and residue mechanically removed from the row prior to planting in order to make transplanting easier and reduce the spread of diseases to young plants from the decaying plant matter. "In asparagus," he says, "the cover, usually rye, is seeded by air after harvest in September and is allowed to grow through winter and spring. In April or May, it is killed with herbicide just prior to shoot emergence."

He says choice of cover crop depends on the vegetable being raised and the amount of residue desired. Rye is used for asparagus because asparagus is a perennial where tillage is not permitted. As the rye dies back the particular texture of its residue tends to interfere less than other kinds of covers with the emerging asparagus plants.

"Different covers with different herbicides create different residue conditions," Chase says. "Some herbicides kill cover plantings which remain standing, other herbicides cause residue to fall and lie flat. Some kill quickly, others are slower. We see differences between types of cover in how much residue they leave on the surface and in how they react to herbicides. We're just

beginning to understand which are the best combinations of covers and herbicides to use."

From an article by Tom Arthur, in the American Vegetable Grower, January 1989.

Hairy Vetch Project Yields Big Savings

Randy Urish may have gotten more than he bargained for when he planted hairy vetch before corn in an effort to reduce nitrogen inputs. To date, the Tazewell County farmer has also been able to save on herbicide costs and the price of feeding 80 head of sheep. Demonstration plots compare the growth of corn with two different rates of nitrogen applied. The corn was planted following hairy vetch.

As a cooperator with the Illinois Sustainable Agriculture Society (ISAS), this was Urish's "maiden voyage" with hairy vetch. He decided to try the crop out of curiosity. "There's been a lot of these types of practices used around Springfield and those guys are saving money," he explained. "So I decided it was time to bring it into this area to see if we can save some money, too."

Last August, Urish had 20 pounds of vetch and 25 pounds of oats sown into a standing field of soybeans by aerial application. A total of 27 acres were seeded. At the end of the winter, the sheep flock grazed for three months on the vetch, allowing Urish to save approximately \$800 worth of hay. Corn was planted directly into the vetch when the legume was 14 to 16 inches high. Urish plants his corn in ridges--a method he believes has been beneficial with the rainy weather. Ridges keep the plants out of water that may stand in the field. He has been ridge tilling since 1983.

The vetch was killed off using one quart of 2,4-D combined with one pint of soybean oil. Rainy weather prompted Urish to double the amount of herbicide he would normally apply. Nitrogen was sidedressed June 10 with one plot receiving 135 pounds of nitrogen and another plot receiving only 70 pounds. Starter fertilizer, including one pint of zinc, was also applied. "There was no plow-down at all when the nitrogen was applied," Urish explained. "I haven't seen any difference between the two plots up to this point."

Perhaps most amazing to Urish is the fact that he has not had to apply any additional herbicide since the 2,4-D was used for burn-down. "This is shocking to me," he said, "Especially since this farm does not have a picture-perfect crop history." It appears that the vetch residue has choked out any grasses that may have appeared in the field.

Bill Becker, ISAS secretary and a consultant to Urish, was not surprised at the performance of the corn with reduced nitrogen. However, the herbicide control was

somewhat surprising. "The herbicide program looks very interesting," he noted. Becker has worked with hairy vetch since 1982. Through years of analysis, he has determined that each inch of vetch growth contributes about five pounds of nitrogen to the soil.

Urish will sow at least 110 acres with hairy vetch during the coming weeks to prepare for next year's corn crop. If both nitrogen and herbicide inputs are able to be reduced again, hairy vetch may have a permanent spot in the crop rotation. "If this has anything to do with the weed control I'm seeing, there's a future for it on this farm," he said.

From an article by Marcie Gerriets in Illinois Agri-News, August 3, 1990.

Business May Buzz for Beekeepers

Environmental influences, changes in state cropping patterns, and the northward movement of the Africanized honey bee could mean more work for Illinois bees. With increased conversion of farm acreage from forage production--and the clovers conducive to honey production--to cash grain crops, Gene Killion, U of I Extension specialist in apiculture (the study of bees), suggests pollination-for-hire could be a honey of a way for beekeepers to sweeten cash flow. That work generally has been the province of migratory southern beekeepers. "There will be less movement of colonies of bees from the South to the North when the Africanized bee arrives," Killion added. "There are regulatory procedures to curtail some of the movement of migratory beekeepers, so we're depending more on Illinois beekeepers to pollinate Illinois crops."

During the 1990 Crop Protection Workshop, Cornell University entomologist David Pimental maintained that increased pesticide use over the years has destroyed honey bees and other "wild bees" which annually pollinate nearly \$30 billion in U.S. crops. "You wouldn't have most of your fruits and vegetables without honey bees," said U of I Extension entomologist Phil Nixon.

Various insecticides differ in their effects on honey bees, and their toxicity depends largely on formulation. According to the 1990 Illinois Pest Control Handbook, sprays are safer for bees than are dusts, and emulsifiable concentrates are less toxic than wettable powders. In particular, Nixon reported, the wettable powder or liquid forms of carbaryl, marketed as Sevin, can dry into particles roughly the size of pollen grains, which may then be collected by adult bees and fed with honey to their young. Nixon recommended producers apply insecticides in the early morning or the evening, and he

discouraged application when blooming crops or weeds may attract bees to lethal chemicals, or when corn is pollinating.

The Illinois Department of Agriculture provides a measure of support for the state's beekeepers through the Bureau of Plant and Apiary Protection and its 16 apiary inspectors across the state. The bureau provides detailed listings of the state's beekeepers to county Extension offices to enable area producers to warn apiculturalists of planned pesticide applications. "We hoped we'd get that cooperation, although, in reality, it isn't always so," said Scott Beam, the bureau's apiary inspection supervisor. Beam reported problems with bees and chemicals were particularly acute in 1988 with proliferation of soybean spider mites (and subsequent massive spray efforts).

Losses in natural bee populations because of chemical use cost American producers an estimated \$135 million a year "minimum," Pimental said, and have led to increased rental of commercial colonies to pollinate orchard and other crops. Illinois beekeepers "contract out" primarily to pollinate apple or pickle crops, and growers normally contract two colonies, or hives, per acre of orchard. Bees are normally placed in the orchard when blossoms are opening and are removed after roughly two weeks, so the orchardist may proceed with spraying schedules. As the season progresses, the bees are moved to melons or pickles for pollination. Occasionally they will be moved early to canola fields, to insure a good set of canola seed.

From an article by Martin Ross in FarmWeek, April 2, 1990.

1991 Illinois Specialty Growers Convention Set

Plans are set to hold the 1991 Illinois Specialty Growers (ISGA) Convention and Trade Show January 22-24, 1991, at the Prairie Capitol Convention Center in Springfield. The format has been changed to eliminate one of the half-days, in an effort to make staying for the entire convention cheaper by one night's lodging. The Hilton will now be the official convention headquarters hotel. Tuesday's program includes an afternoon of joint sessions of interest to all specialty growers, a VIP reception, and the grand opening of the trade show in the evening. Wednesday and Thursday are filled with educational sessions, workshops, and the continuation of the trade show. Talks will address production, marketing, irrigation, and handling of fruits, vegetables, herbs, ginseng, and a wide range of other crops. The trade show should again be full, as we are not in competition with another major Midwest convention this year. Further convention details, contact Barbara Blough, Nessen Company, Barrister Building, 1235 S. Eighth Street, Springfield, IL 62703 (217)744-9350.

Cropking, Inc., of Medina, Ohio, will host the 7th annual Hydroponic Grower's Conference October 12 and 13, in Orlando, Florida. The Delta/Orlando Resort Hotel is the conference site. This conference is open to the public and is specifically for small farmers who either are currently growing or are considering growing vegetable crops by soilless or hydroponic methods.

For more information and registration materials, contact Cropking Inc., P.O. Box 310, Medina, Ohio, 44258. The contact person(s) are Dan Brentlinger and Jim Brown. They can be reached at (216)725-5656.

State Market Directory Available

Prairie Bounty, 1990, a directory of fresh fruit and vegetable markets in Illinois, is published each year by the Illinois Department of Agriculture. This directory lists pick-your-own farms, roadside markets, downtown farm community markets and wholesale suppliers. The listing of growers in the directory is free. For more information on how to become listed in next year's edition, or to receive a current copy, please write Lee Rife, Marketing Specialist, Illinois Department of Agriculture, P.O. Box 19281, Springfield, IL 62794-9281 (217)785-5771.

Know Your State Specialists

In case you don't know or have forgotten the state specialists in vegetable crops with Extension appointments, here are their names, addresses, and phone numbers.

- J.W. "Bill" Courter, Dixon Springs Agricultural Center, Simpson, IL 62985 (618)695-2444
- John B. Masiunas, 204 Vegetable Crops Building, 1103 W. Dornier Drive, Urbana, IL (217)244-4231
- Bill Shoemaker, 535 Randall Road, St. Charles, IL 60174 (708)584-6166 (Kane County Extension Office) or (708)584-7254 (Research Farm)
- Charles E. Voigt, 208 Vegetable Crops Building, 1103 West Dornier Drive, Urbana, IL 61801 (217)333-1969
- Jeff Kindhart, Dixon Springs Agricultural Center, Simpson, IL 62985 (618)695-2444

C. E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



Things are considerably warmer now than when the March issue of this letter went to press. The season is advancing well ahead of schedule, and jobs are piling up. Most areas of the state have quickly gone from too much moisture to too little moisture. Irrigation systems are again a benefit to vegetable producers in Illinois, as they are for at least some producers every season.

As usual, this issue is a mix of topics that should be of interest. Safety remains a concern, especially when the pressures of time begin to weigh heavily on producers. There are some promising nonchemical answers to common pest problems, and a report on a relatively new problem over much of the state—deer. More marketing information, specific crop articles, and announcements fill the space

remaining. We conclude with more recipes for your use, either at home or as sales tools at your markets. Have a safe, productive summer.

Make Farm First Aid a Priority

Be prepared to handle an emergency before it happens. The ability to make decisions in a split second can mean the difference between life and death when an on-farm accident occurs. Accidents are difficult to anticipate, so it is sensible to be prepared. Knowing what to do and who to contact at the time of an accident are very important skills in farm first aid. Teaching these skills is the goal of "First On the Scene," an injury response program for farmers and other agriculturists in the northeast United States. John Pollock, Extension Farm Safety Specialist at Cornell University in Ithaca, N.Y., says the two-year-old program includes teaching farmers the proper technique of getting help to the accident scene. "I'm confident that getting emergency medical personnel on the way is most important, unless there is immediate danger to the person," Pollock says. Another factor in making this decision includes the distance from a phone. If one is close by, call immediately for help; if a phone is several minutes away, take care of the victim first. Also consider whether or not the situation could be hazardous to you.

If the victim must be cared for on the scene, there are three primary considerations. First, make sure respiration isn't impaired. The patient must be breathing and have circulation. Once this is established, control blood loss. Third, treat shock.

Poisoning: Signs of pesticide poisoning vary, depending on the type of pesticide, the amount absorbed, and the general health condition of the individual, says Dave Baker, Extension Farm Safety Specialist at the University of Missouri at Columbia.

The most common symptoms of fungicide or herbicide dermal exposure are dry, cracked skin, a reddening or yellowing skin discoloration, and itching. When these substances are inhaled, the victim may experience burning sinuses, throat, and lungs; as well as coughing, hoarseness, and upper respiratory congestion. When ingested, the victim may experience mouth and throat irritation, chest pains, nausea, diarrhea, muscle twitching, sweating, headache, and weakness.

The most common insecticide poisoning symptoms are headache, blurred vision, pinpoint or dilated pupils, and increased sweating, salivation, and tearing.

Removing the poison is the most important action to take when treating a poison victim. If the poison is on the skin, drench the skin with water immediately. Use caution when removing contaminated clothing. Clean contaminated eyes as quickly and gently as possible—rinse for 15 minutes or longer.

For pesticide inhalation, expose the patient to fresh air at once. If a person swallows a pesticide, the most important decision to make is whether or not to induce vomiting. Never induce vomiting if the victim is unconscious, in convulsions, or if the victim has swallowed a corrosive poison. The best first aid for victims who have swallowed corrosive poison is to dilute the poison with water or milk. *Always save the pesticide and label for the doctor!*

Shock: People can die from shock even if the original injury is not fatal. Shock symptoms are pale, moist, cold, and clammy skin; vacant eyes with dilated pupils; shallow, irregular breathing; and a weak, rapid, irregular pulse. The victim may faint or be unconscious.

Shock victims should be kept flat on their backs unless they are vomiting. Elevate legs 1 to 1-1/2 feet higher than the head if no spinal injury is suspected. Although victims should be kept warm enough to prevent shivering, do not let them get overheated. Keep shock victims quiet and give them small amounts of water or milk, unless poison has been swallowed.

Being prepared for accidents is the best way to prevent serious consequences. Write a plan of action and keep a first aid kit handy. Post a list of emergency phone numbers next to your phone. Calling the operator is not recommended. Post directions to the farm, so everyone can direct emergency personnel on how to get there.

CPM/The American Farmer, April 1991.

634.105
IL AGRICULTURE LIBRARY
JUL 12 1991
UNIVERSITY OF ILLINOIS
AGX

Drift Control Is Essential With Insecticides

Some herbicides keep no secrets. When they drift off target, the results are easily seen. Drift is not as obvious with insecticides, but the chances of it occurring are equally great, and the consequences are more serious.

Here are three reasons to be concerned about insecticide drift:

1. **Safety.** Drift can threaten humans, livestock, pets, fish, and wildlife. Prevent drift to residential areas, parks, highways, ponds, streams, lakes, pastures, livestock facilities, and similar sites.

2. **Crop tolerances.** Insecticide applied to one crop may contaminate another crop not listed on the label. Problems may even arise if the insecticide is registered for use on the drift-receiving crop. For example, if insecticide applied to a field crop drifts to a food crop almost ready for harvest, the pre-harvest interval may be violated; or previous applications to the food crop may already have reached the maximum residue tolerance. Residue problems, and crop rejections, could follow.

3. **Effect on insect control and expense.** Suppose you're spending \$7 per acre for insecticide and application. If 25 percent of the material is lost as drift, you have wasted \$1.75 per acre. Meanwhile, the insecticide reaching your crop may fail to produce expected results, especially if your rate was at the low end of the label recommendations to begin with.

Discussions of spray drift often focus on aerially applied materials. This is an unfair and incomplete viewpoint. Drift can occur with ground sprayers as well.

Here are some ways to reduce insecticide drift:

- **Avoid windy periods.** There are times when wind will cause drift, no matter what precautions you take. Your aerial applicator knows the limits and will tell you when it's too windy. If you are using ground equipment and the weather is questionable, try spraying water. Watch the patterns. If drift is a problem, park your rig and try again when conditions improve.

- **Adjust droplet size.** This is a primary way to control drift. You can regulate droplet size by selection of nozzle tips, pressure, and volume. Smaller droplets give more thorough coverage, but are more prone to drift. With larger droplets, a higher percentage of spray reaches the target, but you get less complete coverage. This calls for an intelligent compromise.

- **Check application height.** An airplane spray boom 8 to 12 feet above the crop canopy generally gives optimum, uniform coverage. With ground equipment it depends on nozzle spacing, pressure, tips, etc. Generally, the closer the spray boom to the crop, the less chance of drift.

- **Watch for thermal inversions.** An inversion exists when there's a layer of cool air close to the

ground with a layer of warm air above. This condition limits vertical mixing of air. Spray applied during an inversion is more likely to move horizontally than vertically.

- **Consider time of day.** Small droplets can remain suspended for long periods during the early morning and evening periods. They are more susceptible to drift then, even with light winds.

- **Use drift retardant.** These products increase average droplet size, though they do not eliminate drift and will not overcome conditions highly conducive to drift. Examples of such products are 38-F drift retardant additive and Chem-Trol spray additive. Use according to label directions.

Using insecticides calls for common sense and good judgment. While protecting your crop from insects, be sure you get the job done without having drift cause additional problems.

From CPM/The American Farmer.

Any Food Can Be Labeled Organic

Healthfoods and organic foods are better because they do not contain pesticides, additives, and other man-made substances—right? Not necessarily, according to Dawn Hentges, University of Illinois Extension foods specialist. Most people assume that foods with labels containing terms "health," "organic," and "natural" are somehow superior to other foods on the grocery shelves; but in fact, foods with these labels have not been found to be better for health than foods without these labels.

"Any food product can now be labeled organic or natural because there are no labeling regulations that restrict the use of those terms, or even define them," Hentges said. New regulations should come from the Food and Drug Administration next year. The 1990 farm bill requires that agency to define "organic" and other terms for food labels.

In the meantime, any food can be labeled organic or natural. So, while consumers believe they are buying organic products that are grown with only fertilizers and pesticides of animal or vegetable origin, in a few studies, foods labeled organic have been found to be just as likely to contain man-made pesticide residues as similar products that do not carry an organic label.

In many cases, organic food is more expensive than other food products. Consumers cannot be sure they will get what they have paid for, Hentges said. "For consumers, organic food conjures up an image of wholesomeness and natural food," she noted. "But in reality, non-organically-grown produce is just as nutritious and high quality as the organically-grown food." Current scientific evidence doesn't support the belief that organically-grown foods are healthier or safer than foods grown by conventional methods, Hentges added.

Illinois Agri-News, April 26, 1991.

Biological Herbicide Promising

What may become known as the first biological herbicide is in the process of being developed. Last summer, University of Minnesota researchers used the natural herbicide, which they call a "smother" plant, to control weeds in corn without reducing yield. Moreover, says weed scientist Don Wyse, using a smother crop would reduce soil erosion and avoid the pollution problems associated with some chemical herbicides.

The smother plant the scientists are working with resulted from crossing subspecies of *Brassica campestris* (the species that includes such crops as Chinese cabbage, pak-choi, and turnip). The dwarf plants grow super fast and develop into a carpet of vegetation, smothering weeds before they have a chance to compete with the corn. After 4 to 6 weeks, they complete their life cycle and die, leaving little residue and giving the corn a relatively weed-free field in which to grow.

Wyse cautions that several more years of research with the smother plant are needed before corn and possibly soybean growers will be able to buy the seed commercially. "What we're doing is releasing an idea, not the plant itself," he said. "It may take 5 to 6 years before it's ready for growers to use." The development of a plant that can be used as a smother crop will likely generate much interest. Wyse said, "As we looked at the increasing trend to reduce herbicide use, we would see the need to develop new weed control options."

Graduate student Robb De Haan, who did some of the research, says, "Dr. Wyse had the idea for a smother crop. Cover crops like alfalfa or rye have been around for a long time, but many of them are perennial or have to be sprayed with an herbicide before a crop can be planted. What we wanted to develop was a short-term, spring-seeded mulch. We call it a smother plant because its primary purpose is to smother weeds." Smother plants, De Haan notes, should "work" during a critical time when weed competition can reduce crop yield.

In 1989, Wyse, De Haan, and plant breeder Nancy Ehlke experimented with yellow mustard (*Brassica hirta*) to determine the characteristics needed in a smother plant. De Haan said, "We wanted something that had rapid germination, didn't get too tall, and did not compete very long." They chose corn as the crop, Wyse said, because it has the highest herbicide use.

After their research with yellow mustard, the researchers zeroed in on exactly what they wanted in a smother plant. They obtained a rapid-cycling *B. campestris* subspecies from the University of Wisconsin, which they crossed with other, locally adapted, brassicas to obtain what they wanted: a short, fast-growing plant with broad leaves.

Field tests last summer were encouraging, De Haan says, with corn yield unaffected by the smother crop. Seed of the smother plant was applied in a band over the row when the corn was planted. Several seeding

rates were tested, but De Haan estimates that growers would probably need to use 4.5 pounds per acre.

Illinois Agri-News, March 15, 1991.

Keep Health Insurance Up to Speed

Costs for medical care have escalated alarmingly over the past few years. As a farmer, you may be affected by these rising costs as much or more than anyone else in the country. Agriculture was rated the second most dangerous occupation in the United States in 1989.

Medical care is expected to exceed \$500 billion in 1990. Keeping pace with the medical industry, the insurance industry reflected a 6 percent increase in health premiums in 1987 and a 12 percent increase in 1988. Back on the farm and ranch, 120,000 residents were disabled by injuries in 1989, according to the National Safety Council's *Accident Facts*, 1990 edition. In addition, the average agriculture insurance premium rose 16.9 percent in 1988.

Health insurance policies can be tailored to cover specific needs. Most insurance companies will write the policy to individual specifications. Variables that affect the cost of medical coverage include:

- **Age:** This is also a factor in the type of coverage selected. For individuals 25 to 40 years old, major medical is suggested. However, those over 40 may want to look into a total health care policy.
- **Deductible:** The amount of out-of-pocket expenses you would have to pay before coverage begins.
- **Smoker/nonsmoker:** Many insurance companies now offer a "nonsmoker discount." Check to see if this pertains to all forms of tobacco.
- **Location:** Rates are based geographically. Many times rural areas have lower rates than urban areas.
- **Occupation:** This is extremely important because some insurance companies *will not* write policies on farmers.

Some health insurance policies carry a clause that exempts work-related injuries. Farmers must be aware of these statements since, in all probability, any medical care you receive will be considered work-related. Incidentally, a similar clause in a spouse's off-farm, employee insurance policy may restrict a farmer or rancher from being covered by that policy.

If regular health insurance is out of the question, farmers and ranchers may consider "state risk pools." The state risk pools find insurers to carry people with pre-existing conditions and special circumstances. Check individual state insurance commissions for more information on risk pools.

Changing the source of health care also may decrease medical cost. However, it won't eliminate, or "cover," them. Community health centers and county health departments may provide primary care, says the National Rural Health Association.

Community health centers, which are federally funded, are sources of integrated and comprehensive primary care and preventive services. In rural areas, the demand for primary care at community health centers increased 18.5 percent from 1984 to 1988.

The National Rural Health Association says one reason for the rise in demand for rural community health centers is the rising number of rural residents who are uninsured. A recent survey showed that 83 percent of new community health center patients in 1986-1987 had no public ???, such as Medicare, or private insurance, or they lacked the income necessary to pay full medical care fees.

Another option to consider is a Health Maintenance Organization (HMO). HMO's provide a specified, comprehensive set of services to an enrolled population on a prepaid basis.

CPM/The American Farmer, *March 1991*.

Farmers Seek Solutions to Deer Success Story

Once nearly wiped out in Illinois, white-tailed deer have made a remarkable comeback, and the deer population explosion has farmers and other landowners seeking solutions for destroyed crops and property.

Deep in Southern Illinois' Johnson County, Dave Allbritten of Belknap has waged a losing battle to control a deer herd that took over his 30-acre alfalfa field and destroyed one cutting of hay. Allbritten, Johnson County Farm Bureau president, counted 40 deer in the field in September. Allbritten's unwanted herd numbered 60 a couple of weeks ago—after he made several applications to the Department of Conservation for nuisance permits, received permission, and shot 10 deer. "The more we shoot, the more show up," he said.

Each Illinois farmer lost an average \$507 in crop and property damage from deer and other wildlife in 1989, according to a state Department of Agriculture survey. Illinois Farm Bureau delegates at the recent annual meeting voted to support efforts to control wildlife overpopulations and to compensate landowners for depredation damage.

The Department of Conservation's challenge is to balance the deer population with the problems caused for landowners, farmers, motorists, and city dwellers. Illinois' deer population was listed as "near zero" in 1890, and the state legislature didn't permit deer hunting until 1956. Alan Woolf, director of Southern Illinois University's Cooperative Wildlife Laboratory, said, "If you'd have asked me or other deer biologists 5 to 10 years ago (if deer would be this plentiful), I wouldn't have thought it could happen."

Illinois' deer explosion can be attributed to several causes. The deer have plenty of food, including farm crops, and few natural predators. The conservation department conservatively managed the growing deer population. "We would rather kill too few than kill too

many," said Gary Thomas, public information officer with the department.

Illinois' deer herd is managed region by region. A computer program, which factors in regional herd fluctuations, assesses if hunting permits need to be increased to control herd size, Thomas said. Besides deer population, the state, when issuing permits, also considers the number of hunters that can safely be allowed to hunt in an area, Thomas said. For example, 500 deer could be hunted in a county, but the state would not allow that if 500 hunters could not hunt safely in the area.

Ironically, hunters are another reason for the population increase. Illinois deer hunters prefer bucks for their antlers. On average, 60 percent of the deer shot are bucks, which leaves more does to reproduce, said John Kube, head of conservation's forest game program.

Finally, recent mild winters have contributed to the population explosion, according to Woolf. Severe winters may affect pregnant does, causing them to have fewer fawns.

Is it possible that the state's population could get so large it would be detrimental to the deer, and the state would be forced to reduce the herd simply to protect the deer? Woolf said it is unlikely such a problem would occur. There frequently is plenty of crop remaining in fields, and that and other vegetation provides a plentiful food supply over the winter.

For landowners, the state's solution is a nuisance permit, which allows two deer to be shot with each permit. Getting a permit is neither quick nor easy. A conservation district biologist must first inspect the damage and decide if it was caused by deer. A landowner normally may receive no more than two permits at a time. Allbritten said it took 21 days from the time he first contacted the conservation department until he received his first permit. Since Allbritten's problems continued, he sought and was granted four more permits. Late last week, he received three more permits.

If a landowner still has a problem after receiving his first two nuisance permits, Kube said the landowner may contact him for more nuisance permits. If the problem continues after that, a district biologist must go back and inspect the site again before more permits can be issued. The state offers no financial compensation and no cost-share programs for fences or other structures to keep deer away from crops.

The state issued up to 50 percent more hunting permits in some areas this year and switched a percentage of the antler-only permits to permits for hunting either bucks or does, Kube said. A new muzzle-loader hunting season will be added next year after being approved by the state legislature.

Several other proposals are being considered by the department director, who is expected to make a decision next January. One proposal is for an antlerless-only permit to be issued in certain counties. Another would increase the December deer hunting season from 3 to 4 days. A third would allow people denied

permits in the first issuance to apply for a December season permit. Allbritten said another solution could be a special hunt in areas experiencing depredation problems.

If you need to reach your district biologist, you may contact the Illinois Department of Conservation, Division of Wildlife Resources, 524 South Second Street, Springfield, IL 62701-1787. The telephone number is 217-782-6384. John Kube may be reached at the same address and telephone number.

FarmWeek, December 17, 1990.

National Food Labeling Becomes Law

The "Nutrition Labeling and Education Act of 1990" was sent to President George Bush for his signature on October 31, 1990. This new legislation provides for the most sweeping changes in food labeling laws in 20 years. It is reported that virtually all food sold on grocery shelves will be affected. The only food not affected by the new law will be infant food, food for medical purposes, and institutional-restaurant food and fresh meat.

The intent of the new law is to ensure that health messages that appear on food labels are truthful and not misleading. It will become effective in 2 years.

The new law requires nutrition labeling on packaged foods, including fresh product and seafood; pre-empts states from enacting labeling requirements different from the federal requirements; requires serving sizes to be uniform and realistic; requires disclosure of total fat, unsaturated fat, cholesterol, sodium, total carbohydrates, complex carbohydrates, sugars, dietary fiber, and total protein; restricts health claims for food ingredients, for example, colon-cancer prevention with fiber-rich foods, based on new standards to be developed by the FDA; and requires the Department of Health and Human Services to define terms such as free, low, light-lite, reduced, less, and high.

Little opposition was found from industry and consumer groups, both feeling the legislation promotes consumer education without imposing restrictions that would complicate and unduly burden food marketing.

The Great Lakes Vegetable Growers News,
March 1991

Colorado Protects Food's Reputation

The Colorado legislature is considering bills that allow farmers to sue for damages when agricultural food products, such as fruit, vegetables, dairy products, and meat have been discredited. The state senate passed a bill, and a similar one passed in the state house of representatives. Under one bill, a farmer could sue within 3 years for up to three times his actual loss. If signed, the law would take effect July 1.

Representative Steve Acquafresca, an apple grower, said environmentalists have hurt farmers by spreading

false alarms about everything from Alar on apples to cholesterol in beef. Acquafresca had support from the Colorado Farm Bureau and organizations of cattlemen, cattle feeders, and dairymen.

FarmWeek, April 29, 1991.

Record Keeping for Restricted Use Chemicals

Private applicators using restricted use pesticides are now required to keep detailed records of pesticide usage. All persons, including greenhouse operators, applying restricted use pesticides are now required to keep a record of the location and dates of application, as well as the type and amount of restricted use pesticide used. **All certified applicators, private and commercial, of restricted use pesticides, agricultural and nonagricultural, must keep records.**

The record keeping requirements resulted from provisions in the 1990 Farm Bill. Until the farm bill was passed, private applicators did not have to keep records—only commercial applicators were required to do so. The following are the provisions for record keeping requirements approved by the House of Representatives and Senate and signed into law by President Bush on November 28, 1990 (effective date).

Records of application of restricted use pesticides must be maintained for 2 years.

All certified applicators (both private and commercial) of restricted use pesticides, both agricultural and nonagricultural, shall keep such records.

Commercial applicators are required to provide application records to the person for whom an application was provided.

Records shall contain information comparable to that maintained by commercial applicators in the state in which the certified applicator resides. If the state has no such requirements, such applicators shall maintain records that contain the product name, amount, approximate date of application, and location of application of such pesticide used.

Records can be made available to any Federal or State agency that deals with pesticide use or any health or environmental issues related to the use of pesticides, upon request.

In no case may a government agency release data, including the location from which the data was derived, that could directly or indirectly reveal the identity of individual producers.

Records shall be provided to health care professionals who request the information because it is needed for medical treatment or first aid to a person who may have been exposed to a pesticide.

Persons who fail to comply shall be subject to a fine in the amount of \$500 for the first offense, and not less than \$1,000 for each subsequent offense, except in the case of a good faith effort to comply.

The Secretary of Agriculture and the Administrator of the EPA are directed to survey records to develop and maintain a data base and publish annual reports. A memorandum of understanding shall define the respective duties of each agency. (Food, Agriculture, Conservation, and Trade Act of 1990, Conference Report (101-916), October 22, 1990).

Monte P. Johnson, Vegetables and Dollars, April 1991.

Farmers' Markets: What Works

First, the produce must be fresh! High quality is essential to keeping the market attractive to weekly customers. Commodities are best when picked the day of sale. Customers like to see carrots with the tops on and melons that are fully ripe.

You need to have a wide variety of products. If you have a display that offers only lettuce or carrots, you'll draw fewer customers than if you sell both carrots and lettuce. Colors are an attractive draw. Stands with three or four items seem about right.

It is possible to sell too many items if you don't have very much of each. People like to see that you offer a lot of each vegetable. If you have only one carton of squash on display, it may appear that your vegetables are "picked over." The higher the heap, the better it sells.

Make displays that look like they came from the fair. Wooden crates or boxes work well. Slant the boxes toward the customer and have the items at least waist high. No one wants to bend down to inspect your produce.

Have your prices on signs that are prominently displayed so customers don't have to ask. Shy customers will walk on by rather than ask for a price. Too often farmers charge too little for their products. Your products are farm fresh and are worth a good price.

Keep a good supply of change on hand, especially quarters, ones and fives. You would be surprised to see how many twenty-dollar bills are offered for a fifty cent sale. Customers are impatient and don't like to wait for change. A carpenter's nail apron has nice deep pockets good for holding bills and coins—then you are ready to offer the correct change on the spot. It also helps to increase the speed of sales.

Supply thin film bags for your customers' use. The cost is minimal and you can buy a roll of 2,000 for about \$10.

If you use a scale or sell by the pound, the scale must be certified.

Markets are funny, in that the middle hours seem to have 70 percent of all sales. You need to be prepared for the "rush hour" swarm.

New York Vegetable Growers News, April–May 1991.

1991 Marketing Plan Works for You

Everyone loves watermelon—or so they say. After all, it's America's favorite fruit. But when it comes right down to it, not everyone is willing to purchase it. Why? Consumers often don't think of watermelon. And when they do, they think of its shortcomings: Too big, too many seeds and "out of season" (meaning anytime before or after the Fourth of July). What's more, some think it's too expensive, particularly when it's sold in pre-cut pieces or chunks.

That's according to research commissioned by the National Watermelon Promotion Board (NWPB) and conducted in the summer of 1990 by Associated Marketing in Chicago. It may sound bleak, but this is exactly the information the Board needs to formulate; a marketing plan that will increase consumers' awareness of watermelon. That's why the NWPB's 1991 Marketing Plan and long-range objectives incorporate this in-depth research. "We are out to maximize the effect of your marketing dollars and actively address the marketing challenges of the watermelon industry," said William Watson, executive director of the NWPB. The NWPB's primary marketing objective is to communicate the benefits of watermelon to its key constituents: consumers, foodservice operators/distributors, and retailers. By reaching these audiences with the message that watermelon is good and versatile (consumers) and profitable (retailers/foodservice), the Board can help to increase consumers' awareness. The 1991 Marketing Plan devotes attention to all three of these audiences through separate, but related programs: consumer/foodservice public relations and trade/retailer relations.

The Melon Report, April, 1991.

New Corn Varieties Need Isolation

Isolation of plantings of the extra-sweet varieties of sweet corn is important, so growers need to make that consideration in their cultural practices. That message came out of a session on sweet-corn genetics March 2 in Ann Arbor at the Southeast Michigan Sweet Corn School.

The newer and sweeter varieties are genetically classified as the sugary-enhancer (se) types and the shrunken-2 (sh2) types, and these are recessive mutations, said Dr. Dennis Banks, who teaches genetics courses at Michigan State University. "So you have to worry about cross-pollination," he said, since field corn and standard sweet corn represent dominant traits that overwhelm recessive traits. Dr. Banks, whose specialty is animal genetics, offered the analogy that "field corn is the black bull that jumped the fence and diluted the genetic purity of the cows on the other side." If se corn is cross-pollinated with field corn, he said, the result will come out like field corn.

The dominant gene fouls everything up when it is of lower quality, noted Randy Lindstrom, a former Uni-

versity of Illinois vegetable specialist who now works for Asgrow Seed Co. out of Hudsonville, Michigan. He recommended that se corn be isolated even from standard sweet corn because such a cross will diminish the sweetness. The end product will be somewhat sweeter than standard sweet corn but will come out less sweet than the grower intended to bring to market, he noted. Sh2 corn, Mr. Lindstrom stressed, especially has to be isolated. "Keep it away from everything else," he said. "If you pollinate this with anything else, you're out of luck." He advocates uniform plantings of sweet corn, whatever the type. "Don't plant any type with any other type of corn," he said.

Paul Marks, Extension agricultural agent for Monroe County and one of the coordinators of the school, noted that the concept of isolation can take several forms. "There's no pat answer. Distance (between plantings) is just one option," he said. Planting timing can also enhance isolation, and field positions in relation to prevailing winds can also effect some degree of isolation, he said. In addition, Mr. Marks pointed out, the positioning of a tall crop between corn fields can cut down on the movement of pollen between them and offer some protection.

Dr. Banks, in answer to a question from the audience about whether genes get stronger with age, explained that "they do not change." A plant or animal, he said, "retains the same genetic makeup throughout its lifetime." There can be changes in genetic expression at different stages of that life, but the genetic constituents themselves are constant, he said. He gave the example of the baldness gene, which is inherited, but men with such a gene do not become bald immediately. Rather, he said, it is expressed later in life. "But the genetics themselves remain constant," Dr. Banks said.

The Great Lakes Vegetable Growers News,
March 1991.

Looking for Alternative Crops? You Might Consider Broccoflower!

A relatively newly created vegetable might mean more dollars for farmers willing to experiment with a crop not usually grown in this state.

Broccoflower is a genetic cross of broccoli and cauliflower, said John Strang, Extension horticulturist with the University of Kentucky College of Agriculture. "It looks like cauliflower—but has the greenish color of broccoli," Mr. Strang said. "It has the texture of cauliflower, but a tang from broccoli gives it a sweeter taste than traditional white cauliflower.

Why should farmers want to raise it? There's a growing market for the new vegetable nationally, Mr. Strang said. Soil conditions appear to suit Illinois for commercial production.

"It's selling faster than it can be grown," Mr. Strang said. "It's mostly grown now in California. If local buyers could get it locally, they could save expensive

transportation costs." Broccoflower can be grown anywhere regular cauliflower is grown. "In fact it is usually planted with regular cauliflower so that it can be harvested at the same time," Mr. Strang said. "It is harvested, wrapped, and packed in the field."

Production techniques are very similar to raising cauliflower, he said, except the farmer wants the leaves of broccoflower to open up so that sunlight can bring out its green color. Leaves of the regular cauliflower are kept closed to enhance its white color.

The Great Lakes Vegetable Growers News,
March 1991.

The Search for the Perfect Carrot

More than 6,500 years ago, carrots were grown in the Near East and middle Asia. Carrot production evolved and spread, as did uses for the crop. Carrots were valued for their medicinal properties by Celtic and Roman settlers. Feathery carrot greens were worn in the hair by English women in the 18th century.

It wasn't until the early 1900s that scientists determined carrots were a good source of vitamin A. Additional research showed vitamin A deficiencies were responsible for night blindness, damage to eye tissues, blindness, and even death. Adding an improved carrot variety, with higher vitamin A content, to the diet could help minimize these problems.

The search for the perfect carrot was on! Doctor Philip W. Simon, USDA geneticist, and Dr. Clinton E. Peterson, USDA horticulturist, were pioneers in developing carrots that contained higher levels of beta carotene, the pigment which is converted by the lining of the intestine into vitamin A.

While developing a carrot resistant to leaf blight fungi, Drs. Simon and Peterson discovered a carrot which they named Beta III, that contained approximately three times the typical beta carotene levels. Doctor Peterson contacted Asgrow Seed Company in Kalamazoo, Michigan, seeking help in getting more of the Beta III seed produced, because of its potential for relieving vitamin A deficiencies.

Asgrow has begun research with Beta III, and the company has arranged testing throughout the world. The goals of their research include improved color and flavor, as well as higher carotene levels.

In an effort to increase carrot consumer appeal, the seed company introduced the Caro-Bunch™ varieties, a carrot product line that has exhibited improved color and flavor, combined with high nutritional values.

They've also signed a spokesperson to talk about the nutritional advantages of fresh produce. To educate consumers, particularly teenagers, about the important benefits of a healthy lifestyle, Asgrow Seed Company retained Camille Duvall, five-time national waterskiing champion.

The Great Lakes Vegetable Growers News,
June 1990.

Growth Regulator May Help Manage Sweet Corn

Producers of fresh market and processing sweet corn find difficulty in growing and handling some hybrids that are too tall. Due to excessive growth habits, these hybrids have a propensity to lodge, are difficult to harvest by machine or by hand, and cannot be planted at high densities to achieve maximum yields.

Consequently, producers are often reluctant to grow these otherwise high-quality hybrids. A plant regulator that would reduce the height of these hybrids at harvest without affecting critical yield characteristics would be beneficial.

In a study by Dr. Richard Straub, New York State Agricultural Experiment Station, Hudson Valley Laboratory, Highland, New York, Cerone™ (ethephon with 39.9 percent active ingredient) was used on sweet corn. Dr. Straub showed that the growth regulator was an effective means of reducing the excessive growth of some sweet corn hybrids.

Dosage was a more important factor in reducing plant height than was application timing. Ear weight and ear length of some hybrids was reduced, but not by more than one ounce per ear or one inch per ear. The earlier the plant growth at application, the greater the reduction.

His study also showed that treatments caused a significant number of ears in which the cob tip grew beyond the covering. Treatments had no differential effects on 'normal' and 'supersweet' sweet corn types.

The Great Lakes Vegetable Growers News,
June 1990.

For Itsy-Bitsy Salads

Minis are a hot item in flowers, but small is also big in produce. Case in point: iceberg lettuce the size of tennis balls—which could hit grocery stores as early as 1993.

Drs. Edward Ryder and William Waycott developed the mini-lettuce by altering a lettuce gene critical to a natural growth hormone called gibberellin.

The single-serving lettuce, not to be confused with small butterhead types, is a true dwarf and takes about 5 days longer to mature than conventional iceberg lettuce.

Greenhouse Grower, *June 1991.*

Sweet Potato Suffering Identity Crisis

Strongly associated with Thanksgiving, Christmas, and to a lesser extent Easter meals, the sweet potato, according to scientists and cooks, has roots deeper than that and has, for too long, been confused with its rough cousin, the yam.

Sweet potato production has declined over the last 30 years, according to figures from the Census Bur-

eau's census of agriculture. About 29 million bushels were harvested in 1959 from 218,000 acres, 17 million bushels in 1974 from 86,000 acres and, 16 million bushels in 1987 from 73,000 acres.

What happened? Apparently, the sweet potato has become too strongly associated with those few holidays, and the feeling may be that they should be eaten only during those times. Fewer than 10 percent of Americans say they buy sweet potatoes more than once a month, according to agriculturalists from the University of Georgia.

What a waste of a traditional American resource! The sweet potato, as its supporters are fond of pointing out, is rich in vitamins A and C, has a good deal of potassium, and has more calcium and iron than the white "Irish" potato.

As a matter of fact, sweet potato proponents say it should be baked plain like the good old baked potato instead of being dolled and dandied up in maple syrup and marshmallows. Researchers have found that plain baking is the best way to cook the sweet potato and does the most justice to its natural flavor.

The sweet potato, which can vary in both firmness and color, is a member of the morning glory family. Scientifically, it is called a dicot, or two-leafed embryo. The yam, also a vine, is a monocot, or one-leafed embryo. Most yams are consumed by their producing country, and few find their way into world trade. True yams may grow to weigh a hundred pounds, and although prepared like sweet potatoes, yams have white to yellow flesh that seldom is sweet.

Worldwide, some 132.9 million metric tons of sweet potatoes were grown in 1987. American production that year, according to the 1987 census, was some 0.4 million metric tons. So, even if the sweet potato's popularity is declining in the United States, it obviously has appeal beyond our borders; many recipes reflect European, African, and Caribbean influence.

North Carolina, according to the 1987 census, was the country's largest producer, with just over 1,000 farms growing sweet potatoes. Yet the total was down from 1,962 such farms in 1982.

Rural Enterprise, *Winter 1991.*

Herbs Are a Healthy and Tasty Substitute for Salt

Many people are cutting down on the amount of salt they shake on their food. So they may be interested to know that fresh herbs can serve as a flavorful salt substitute to almost any food you prepare. But that's not all . . .

Robin Cowen, University of Illinois horticulturist, says a large variety of herbs can add special flavors, textures, and colors to everything from soups and salads to vinegars. And you can grow these herbs in gardens right here in the Midwest. Some are annuals, others are perennials.

Salad burnet is the first herb she suggests. It's a beautiful ornamental perennial that has mild cucumber-flavored leaves. Use the leaves whole or chopped as an addition to vegetable marinades or salads. The whole leaf can be used alone, or in combination with dill, to add flavors and texture to vinegar.

"I slice tomatoes, top them with snipped salad burnet, and then drizzle with dark opal basil vinegar," Cowen said. "Then I garnish with whatever herb I have handy at the time: parsley, dill, fennel, or chives flowers. It adds a wonderful flavor."

Basil is an herb she likes to use for fruit salads. Cinnamon or lemon basil can be snipped between layers of fresh fruit. She suggests adding a flowering sprig of cinnamon basil for a garnish.

Lovage is a tall perennial—a perfect substitute for celery. Use the foliage, chopped fresh in salads or dried in soups. The stem is hollow and makes the perfect straw for sipping tomato juice.

For a peppery flavor, consider using the bright nasturtium flower chopped up in salads or finger sandwiches. Both the flowers and leaves are edible and can be used as garnishes in salads or soups. Cowen cautions to use them sparingly because the flavor is quite strong.

The nutty flavor of caraway is often added to rye bread. Cowen says it is also an excellent addition to a number of dishes, including soup. The seed can be added whole or ground to potatoes, beans, peas, pork, or fish. If you are adding the seed to soup, it should be done in the last 15 minutes to avoid a bitter taste brought on by a long cooking time.

Both dill and fennel have fine-textured, blue-green foliage. Dill is an annual and is shorter and single-stemmed, while fennel is a perennial and has a multi-stem with a large seed head. The flavors are very different. Fennel has a licorice or anise flavor, and dill's flavor is associated with pickles.

The foliage and seed of dill and fennel can be added to salad dressings, dips, vegetables, breads, or fish. They make attractive garnishes too.

Even though parsley is best known for its use as a garnish, it is high in vitamin C and iron. Add it to vegetable and pasta salads and rice dishes. Just snip off the leaves into the food you are preparing. The flat-leaved Italian type is preferred for cooking, and the curly-leaf variety is used for garnish. Parsley is biennial and flowers in the second year.

University of Illinois Agriculture Communications,
in *The Daily Journal*, Kankakee, IL, May 1, 1991.

As an Herb, Horseradish Adds Dynamic Flavor to Dishes

If you've ever taken a hearty whiff of ground horseradish, you know why it's considered by many as a powerful herb. To capture this power in a tiny jar for American consumers to enjoy is an art in itself.

The horseradish is a member of the mustard family and is cultivated for its thick, white roots. The bite and aroma of horseradish is almost absent until the root is grated or ground. During this process, the root cells are crushed and volatile oils are released. Vinegar stops this reaction and stabilizes the flavor. The degree of "heat" generated is determined by when the vinegar is added. For milder horseradish, the vinegar is added immediately.

Horseradish appears in many guises in the supermarket and specialty food shop: basic prepared horseradish is the grated fresh horseradish root mixed with distilled vinegar. Spices or other ingredients may be added (such as salt, sugar, cream, or vegetable oil) to enhance and protect flavor. Varieties of prepared horseradish include cream style horseradish, horseradish sauce, beef horseradish, and dehydrated horseradish, among others.

Many sauces, dips, spreads, relishes, and dressings also feature fresh horseradish as an ingredient. For example, there's cocktail sauce with fresh horseradish and mustard with fresh horseradish. Look for these prepared horseradish products in the grocer's refrigerated section or on the appropriate shelf.

Vegetables are increasingly popular in this diet conscious, nutrition minded world. And no one needs to be coaxed to eat, when horseradish sparks up the dish.

Squash Casserole

2 pounds summer squash, zucchini, or a combination, sliced
1 onion, diced
1/2 cup water
1/4 cup butter or margarine
3 tablespoons horseradish
Salt and pepper to taste
1/2 cup buttered bread crumbs

Cook squash and onion in water until tender. Drain, add butter or margarine, horseradish, salt, and pepper. Pour in casserole dish and top with buttered bread crumbs, and broil until lightly browned. For four to enjoy.

Leek Salad

8 firm fresh leeks, 1 inch in diameter
1/4 cup sour cream
1/4 cup cider vinegar
1/2 teaspoon Dusseldorf-style prepared mustard with fresh horseradish
1 teaspoon prepared horseradish
Salt and pepper to taste

Cut off roots, strip away tough outer leaves, and remove tops. Halve lengthwise and cut into 2–3 inch pieces. Wash under cold running water to remove sand. Cook in boiling water 15–20 minutes until crisp-tender. Drain. Combine 1/4 cup cooking liquid with next five

ingredients. Beat with whisk or spoon until well blended. Pour over leeks. Chill 1 hour or longer. For four to enjoy.

The Daily Journal, *Kankakee, IL, May 1, 1991.*

An Un-Beet-Able Leaflet

Recently, the National Garden Bureau published a fact sheet about beets and declared 1991 the Year of the Beet. You can order up to 10 copies free from: National Garden Bureau, 1331 Butterfield Road, Suite 310, Downers Grove, IL 60515; or you can order by phone 708-963-0770. They also have a slide set available for \$12. So be upbeat about Beets!

Doug Sanders, in Vegi-News.

Fruit, Vegetable Guide Offered

Illinois consumers may not realize it, but opportunities abound for buying fresh, home-grown fruit and vegetables. Each year in April, the Illinois Department of Agriculture publishes *Prairie Bounty*, a directory listing the various U-pick, roadside, and community farmers' markets. This free guide helps consumers find fresh, wholesome produce within easy driving distance.

Prairie Bounty was developed and distributed in cooperation with the University of Illinois Cooperative Extension Service and the Illinois Department of Commerce and Community Affairs.

Prairie Bounty is divided into three parts: pick-your-own fruits and vegetables and roadside markets; farm community markets; and wholesalers. Operators are listed alphabetically by town within each district.

Also, each listing provides the following information: name of farm or operation, mailing address, telephone number, directions to the facility, days and hours of operation, and the types of produce available.

Producers wishing to be listed in the directory can contact Lee Rife at the Illinois Department of Agriculture, Division of Marketing, Illinois State Fairgrounds, P.O. Box 19281, Springfield, IL, 62794-9281.

To obtain a free copy of *Prairie Bounty*, mail a request to the Illinois Department of Agriculture or call 217-82-6675.

Illinois Agri-News, April 5, 1991.

Twilight Vegetable Meeting at St. Charles

Bill Shoemaker of the St. Charles Horticultural Center announces a twilight meeting at the center July 30, 1991, at 7 p.m. Numerous variety trials and cultural studies are featured with special emphasis on peppers, sweet corn, tomatoes, and melons. Come early and inspect the various studies. Specialists should be on hand to handle questions. For more information, call Bill Shoemaker at 708-584-7254.

C. E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



What a summer! Who knew when we were still soaking wet in early June that drier days were ahead? As the weather becomes more and more unpredictable, irrigation becomes more and more important in vegetable crops production. With the quality standard that today's market demands, supplemental water is almost a necessity.

I hope everyone made it through the summer with minimal losses and at least a few successes. This issue deals with money, pesticides and pest control, tillage practices, irrigation, mulches, interesting crops, yet another opinion on organic growing, and more.

Loan Program Targeted to Vegetable, Specialty Crop Growers

A new farm lending program could pave the way for Illinois to become a leader in vegetable and specialty crop production, supporters say. State Treasurer Patrick Quinn has announced that his office will make state money available to banks throughout Illinois for low-interest irrigation equipment loans.

Treasurer's office spokesman David Vaught said the loan program offers good long-term and short-term investment opportunities for farmers. "This is a classic in targeted investment," he said. Irrigation offers the immediate benefit of increased productivity with currently grown crops while setting the stage for Illinois to become a leader in vegetable and specialty crop production, Vaught said. The money comes from the state treasurer's Agriculture Deposit Loan Program, which now has around \$500,000 targeted for the irrigation loan fund in each area, according to Vaught.

Due to sandy, dry soil conditions, five areas in the state are receiving special consideration for the loan, Vaught reported. The Rock Island area south of Moline, the south side of the Illinois River near Peoria and Pekin, the area along the Wabash near Lawrenceville, the area southeast of Kankakee, and an area between Henderson and Mercer counties all will have loan funds deposited in local banks.

Vaught noted that California and Florida are enduring water restraint problems that could

create a gap in vegetable production that Illinois could fill. "We have the potential to attract a lot of food processing to the state with added irrigation," he said. "This isn't a pie-in-the-sky kind of thing. . . . We'll see the immediate effects on corn and bean production plus conversion for the future. When you have more acres under irrigation, more acres are available for food processing."

Banks that participate in the program will owe the state 6 percent interest and in turn can charge farmers no more than 8 percent for irrigation equipment loans, Vaught explained. The 2 percent profit margin is a little tight, according to a spokesman for one participating bank.

Charles Stoddard is vice president for agriculture for the First National Bank of Sterling. Located in Whiteside County near Moline, Stoddard said his bank enrolled in the program for the benefit of future economic development. "We'd like to see 3 percent to help us cope with rising overhead costs, but it could potentially be a very good program to help boost the local economy," he commented.

Stoddard said the program is coming somewhat late in the season for new irrigation units to be built, but added that additions and replacements of existing units will be covered by the loan program before the season ends.

Illinois Agri-News, August 16, 1991.

Landmark Ruling on Pesticide Use

A decision with possible far-reaching ramifications for farmers in Illinois and elsewhere was handed down by the U.S. Supreme Court in June. The decision in essence would allow local governments (municipalities, counties, or townships) to establish pesticide laws even more stringent than those set down by the federal government. The Supreme Court's decision overturned a Wisconsin Supreme Court ruling that said local regulation of pesticide use was preempted by federal law.

The American Farm Bureau Federation and Illinois Farm Bureau (IFB) will attempt to obtain a copy of the ruling. "We will study it to determine how far local governments can go in regulating use of ag chemicals," said Leonard Gardner, IFB executive director of governmental affairs. "The decision would appear to transform pesticide regulation from a national issue to an issue of a much more local nature," he said.

IFB President John White, Jr. said he is concerned about the potential for local regulation in areas with large urban populations and the potential for a farmer with farms in different areas to face distinctly different rules governing pesticide use. "The decision poses a challenge to farmers to continue to



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

AGRICULTURE LIBRARY

OCT 11 1991

demonstrate that we are doing an excellent job of handling and applying crop chemicals in ways that protect the environment and human health," said White. "Federal and state laws already do a good job in this area. We simply have to provide continuing assurances that local regulations are unnecessary," he said.

Farm Week, June 24, 1991.

Wash-off Data Surprises Researchers

It's not the intensity but the volume of rain that counts when it comes to washing pesticides off plants. The first tenth of an inch of rain removes almost all of the pesticide that is going to wash off, regardless of how long it takes for that amount to fall, according to studies by USDA Agricultural Research Service (ARS) soil scientist Guye H. Willis. "It doesn't matter whether it takes a minute or an hour—a heavy storm or a sprinkle—for a tenth of an inch of rain to fall. It's that volume that's the significant factor, not how hard the raindrops hit the leaves," said Willis, who works at the ARS Soil and Water Research Unit in Baton Rouge, Louisiana.

The studies, which were done in cooperation with the Water Quality and Ecology Research Unit at the USDA National Sedimentation Laboratory in Oxford, Mississippi, indicate that organochlorine pesticides are the least susceptible to being washed off by rainfall. Water-soluble chemicals are the most susceptible. For example, one-tenth of an inch of rain will wash off about 50 percent of a water-soluble pesticide that was on the plant when the rain began. Only about 2 percent of the organochlorine pesticide, which has very limited solubility in water, would wash off in the same amount of rain.

Previous studies did not consider which is the significant factor in pesticide washoff—the amount of rain, the size of raindrops, or the energy with which they fall. "With the shift toward short-lived pesticides, their concentration in runoff will become more of a function of the chance of rainfall washoff," Willis said. "For farmers, this work just confirms how much impact even a light rain could have on the effectiveness of their pesticides," Willis said.

The Grower, July 1991.

Be Aware of Above-Ground Tank Rules

State regulations on above-ground fuel storage tanks haven't changed, but tighter federal regulations are expected from the U.S. Environmental Protection Agency in about two years. Dale Tanke, storage tank safety engineer with the state fire marshal's office, said officials anticipate the new regulations may include rules for tank corrosion protection, leak detection, and financial liability for environmental cleanup. "But we don't

know for sure" what the rules will be or how extensive they will be, Tanke said.

Until new federal rules are issued, the state fire marshal's office has several requirements with which farmers must comply. Farmers and some entities are granted an exemption to store fuel in above-ground tanks, but fire marshal representatives have indicated some restrictions will apply. "Basically it (above-ground-stored fuel) is not (to be) for retail use," Tanke explained.

Among regulations the fire marshal enforces are:

Farmers are allowed to have a maximum of two above-ground tanks, each with a capacity of up to 2,500 gallons. The two-tank limitation is per farm.

A tank must have an Underwriter's Laboratory (UL) label.

It also must have a dike that would contain 100 percent of the tank's capacity in case of spill or leak. The dike may be earthen, concrete, or a manufactured pre-form dike.

Tanks must be located within setback zones. Those are:

- 300 feet from any mine shaft or air escape shaft to any mine;
- 85 feet from any school, church, hospital, or place of public assembly;
- 30 feet from buildings, other stored combustibles, or flammable liquid;
- 30 feet from sewers, septic tanks, cesspools, or cisterns;
- 30 feet from property lines.

"We haven't really gone out and beat the bushes to enforce" the regulations, but the violations do carry penalties, Tanke said.

Farmers are required to get a free permit from the state fire marshal's office to install or move a tank. If the tank is a used one, it must be recertified by the manufacturer. To get a permit, send an application form and site plans showing property lines, buildings, and the distance from other items in setback requirements.

Application forms and permits are available from the State Fire Marshal's Office, Division of Petroleum and Chemical Safety, 1035 Stevenson Drive, Springfield, Illinois 62703, 217-785-5878.

A state law, the Responsible Property Transfer Act, may add further confusion if farmers are told they have to report above-ground tanks. Farmers would not have to report above-ground tanks to potential property buyers under the law so long as their property does not meet the law's definition of real property. Property is considered real property if it contains an underground fuel storage tank greater than 1,100 gallons or there are hazardous materials stored on the property. However, farmers should check the matter with their attorneys.

Gerel Brown, director of environmental and regulatory services with GROWMARK Inc., said the company has encouraged member cooperatives to put full containment around bulk fuel storage tanks for the last

four years. "We believe it's important to stay ahead of regulations," Brown said. Co-op personnel are more aware now than in the past of the environment and potential risks.

More cooperatives are budgeting for environmentally sound improvements in their capital expenditures. "They know they have to spend money to keep the environment clean," he said.

Many underground fuel storage tanks have been removed because of tighter federal regulations, but the state fire marshal's office warns farmers not to use those tanks above ground. Dale Tanke, storage tank safety engineer, said it is dangerous to store fuel above the ground in tanks which had been underground. Underground tanks are not built as strong as their above-ground counterparts. Underground tanks are designed to use backfill material for structural support.

Above-ground tanks are made from thicker metal and have vents. "Underground tanks do not have emergency vents, so if they were to catch on fire, they would explode instead of releasing vapors," Tanke said. Once an underground tank has been removed from the ground, it must be properly cleaned to remove all fumes. Even after a tank is thoroughly cleaned, dangerous fumes could build up again if the tank remains intact. Most underground tanks are made of steel and would be accepted by scrap dealers.

FarmWeek, February 11, 1991.

Organic Foods—A Better Choice?

"Eat those vegetables!" your mom always said. Now cancer researchers are echoing that old refrain—with gusto—and adding fruits and whole grains to the advice. "Harmful Pesticide Residues Found in Produce," the newspapers warn. "Chemical Fertilizers Robbing Crops of Essential Nutrients," the headlines continue.

What do I do now, you might find yourself wondering. Are organic foods the only safe ones to eat? Just what is organic food? While there is no federally regulated standard for foods labeled "organic," they are usually defined as foods that have been grown without the use of artificial fertilizers or pesticides and contain no additives. Whether or not they are a better alternative to food grown by standard methods depends upon whom you ask.

While a growing number of people are turning to organic products, the Environmental Protection Agency (EPA) reassures us that today's food supply is the safest in the world—and "certainly safer than it was yesterday"—according to EPA's Albert Heier. He acknowledges that some pesticides "may pose an unacceptable risk," but says the agency is taking action to identify and remove those pesticides from use.

Some scientists in the field believe the pesticide hazard is insignificant when the chemicals are applied in accordance with government regulations and the foods are properly washed; they also feel that there is

no significant nutrient advantage in organic foods.

According to the Food and Drug Administration, nutritionally, fruits and vegetables are "virtually the same, regardless of the method of production."

On the other hand, the director of Americans for Safe Foods, Roger Blobaum, notes "the big advantage of organic food is the assurance that it does not contain any harmful pesticide residues." His group supports policies that encourage farmers to use methods that will enable them to move away from farming chemicals toward more environmentally sound production methods. "The result," he says, "will be fewer harmful residues in fruits and vegetables and other food, which will contribute to a more healthful diet."

If you choose to use organic foods, here are a few guidelines to assist you:

- In grocery stores, look for a certificate or label that says the food is certified as organic. A list of reputable agencies that certify organic food can be obtained from Americans for Safe Food, 1501 16th Street, NW, Washington, D.C. 20036, 202-332-9110. Organic foods are not regulated by the federal government. Be prepared to pay; with the limited supply of organically grown foods free of pesticides, the cost can be quite high.
- Grow your own organic vegetables. A small patch or even a sunny windowsill will let you begin.
- Ask your grocery store manager to offer organic food and to label it accordingly.
- Shop the small farms. Many small organic farms are springing up near cities and towns, and often offer roadside market stands.
- Join or start a food buying club. These groups forge direct ties with growers in their areas who agree to make organic foods available in bulk and at a big savings.
- Buy by mail. Arrowhead Mills in Hereford, Texas, and Walnut Acres in Penns Creek, Pennsylvania, are two reputable suppliers.

American Institute for Cancer Research Newsletter, *Spring 1990.*

Alternatives to Chemical Insecticides Researched

Natural enzymes found in insect-eating fungi could give farmers and gardeners a custom-made alternative to chemical insecticides, according to U.S. Department of Agriculture scientists. "We have identified certain enzymes that appear promising for making fungi lethal to insects that attack corn, cabbage, wheat, and other crops," said research geneticist Timothy D. Leathers of the USDA's Agricultural Research Service. Many fungi secrete enzymes that break down an insect's skin. That lets the fungus penetrate, multiply, and consume

the insect, said ARS microbiologist Subhash C. Gupta. He and Leathers work at the agency's Northern Regional Research Center in Peoria, Illinois.

Beyond continuing the enzyme search, Leathers said, the next steps would be to genetically engineer the most promising enzymes into various fungi and devise means for commercially mass-producing the fungi. "Genes that make the newly-identified enzymes could be placed into other fungi and make them amenable to growing on insects that they otherwise would not infect," Gupta said. "Fungal spore containing the enzymes could be mass-produced and sprayed onto crops."

In some lab tests at the Peoria research lab, fungal spores killed 50 percent of the target insect species within four days. The researchers studied five strains of a common soil fungus that produce a variety of enzymes. They did not reveal the identity of the fungus since they are applying for a patent on the new enzymes and the fungal species and five strains.

The work is being supported by the Biotechnology Research and Development Corporation. The corporation, a consortium of companies, universities, and the Peoria center, was formed in 1988 to develop new commercial products from research. "Identifying these enzymes is important to the corporation and its member companies because we're hoping to introduce more natural products to help agricultural problems and, at the same time, show reasonable concern for the environment," said J. Grant Brewen, corporation president.

Illinois Agri-News, March 15, 1991.

Herbicide-Resistant Weeds Giving Farmers a Run for Their Money

Farmers spend millions of dollars to control weeds each year, but those weeds are beginning to outsmart producers, according to several weed scientists. Herbicide-resistant weeds are springing up across much of the country, giving farmers a run for their money in terms of control.

During a recent conference sponsored by BASF Corporation, leading herbicide-resistant weed researchers met to discuss the problem. "Herbicide resistance is the ability of a weed biotype to withstand the treatment of a herbicide," said Donn Thill, weed scientist at the University of Idaho. According to Thill, herbicide-resistant weeds were first discovered in the 1960s in a nursery. Since then, resistant weeds have been found in 32 states, 4 Canadian provinces, and 14 countries.

Although herbicide-resistant weeds develop on their own, Bill Lueschen, agronomist at the University of Minnesota's Southern Experiment Station, said there are certain farm practices that may lead to herbicide resistance. They include:

- Continuous corn and repeated use of herbicides with the same mode of action.

- Continuous soybeans and repeated use of the same mode of action.
- Corn/soybean rotation and repeated use of the same herbicide mode of action.

Lueschen said such rotations and herbicide usage place a lot of pressure on the selection process, thus resulting in the formation of resistant weeds. Development of weed resistance can be reduced by rotating crops and selecting herbicides with different modes of action, Lueschen said.

Additionally, Lueschen said farmers can use alternative means of weed control, such as cultivation, to control weeds. Thill pointed out that many of the resistant weeds, including prickly lettuce, kochia, and pigweed, have developed either triazine or sulfonyleurea resistance.

Triazine herbicides are absorbed by the roots of plants and are then translocated to the leaves, where they inhibit the ability of the plant to photosynthesize. Sulfonyleurea herbicides bind to and inhibit the production of the enzyme acetolactate synthase and therefore inhibit the ability of the plant to grow roots and shoots.

Because of the resistance that develops, Thill said it is very important farmers rotate their crops as well as rotate their herbicide's mode of action. Additionally, Thill said, cropland is not the only area about which farmers should be concerned when considering the implications of resistant weeds. "One area we need to remember is the roadside," he said, adding that many resistant weeds can take root and flourish in such areas.

A concern expressed by many of the experts at the BASF meeting is the prospect of weeds such as shattercane and johnsongrass developing herbicide resistance. "True resistance has not been found at this time (for these weeds), but there is potential," said David Regehr, weed scientist at Kansas State University.

Weed resistance is not a major problem in Illinois and Indiana, said Purdue University weed scientist Merrill Ross, who was not present at the conference. He added that he, too, thinks shattercane and johnsongrass could develop a resistance if farmers are not careful. "There's been no selection pressure so far," said Ross. "If we can avoid the continuous use of products by themselves and use some common sense, then we really shouldn't have a lot of problems."

Illinois Agri-News, March 15, 1991.

The Honeymoon's Over

Commercial growers and home gardeners all over the world have relied on *Bt* (*Bacillus thuringiensis*) for years as the answer to pest problems—it's effective, environmentally safe, and insects have shown no resistance to its effects; until now, that is. The first cases of resistance in the field to this biological insecticide were recently documented in Hawaii, reports the *Cornell Small Fruit Newsletter* (January-February 1991).

The incidences occurred at two commercial watercress farms on the island of Oahu. Growers noted the insecticide didn't seem to be as effective as usual in controlling the diamondback moth. Laboratory bioassays bore out the suspicion—populations of the moth that had been repeatedly sprayed showed more than 30 times the resistance of strains that had not been exposed. A second incidence was later noted and documented in a commercial cabbage field on the island of Hawaii.

"It's just a question of time before this resistance shows up in other locations and in other insects, especially if we continue to use *Bt* as extensively as we have been," says Bruce Tabashnik, an entomologist at the University of Hawaii. He recommends avoiding exclusive use of *Bt*, and suggests combining it with biological controls—such as natural predators and parasites—and cultural controls, and setting "economic thresholds": levels of damage at which spraying is economically necessary.

National Gardening, *July/August 1991*.

Weed Control for Insomniacs

Are you struggling to keep the upper hand in the battle with weeds? Next season, get off to a head start—till on a moonless night. That's the recommendation of German botanists, who've found that cultivating in the dark can result in an "astonishing" reduction in weeds.

For most weed seeds buried in the soil of typical garden plots, the five or less seconds of light they receive during daytime tilling is just enough to induce germination. Test plots tilled under a full moon resulted in 78 percent fewer weeds as compared with plots tilled at noontime, according to the *IPM Practitioner* (October 1990). Cultivation in complete darkness (no moon or starlight) resulted in even fewer weeds.

For growers not ready to invest in a pair of night-vision goggles, there's other encouraging news: better weed control can also be achieved by tilling at twilight or dawn.

The researchers recommend cultivating crops in the light early in the season (to reduce the weed seedbank) and then tilling again in the dark several weeks later. To prevent selection of weeds capable of germination without light, "dark-tillage" should be done only every other year.

National Gardening, *July/August 1991*.

Drip Irrigation Surges Ahead

Water problems in California have forced many growers to rethink ways to reduce water usage even more. One of the ways that a growing number of growers are turning to is drip irrigation. "Growers are finally getting the message that drip irrigation pays," says Jim

Roberts, owner of Roberts Irrigation Products in San Marcos, California. His company, established in 1968, is one of the forerunners in the country in drip irrigation.

Roberts says that interest in drip irrigation has skyrocketed during the last couple of years. Tim Hartz, Extension vegetable specialist at the University of California-Riverside, adds, "Five years ago you paid 3 cents a foot (for drip tubing) that wasn't very well engineered. Today you can get high-quality 8 mil flow tape for about 2 cents a foot." Hartz estimates that few acres of fresh-market tomatoes were under drip three years ago. Today as much as one-third of the crop is drip irrigated. Just as dramatic an increase has occurred in California for peppers.

The Grower asked Extension and industrial drip irrigation experts how growers can use the latest drip irrigation tubing. Here are their reports of common problems and solutions:

- **Improper watering.** Even though drip technology has come a long way, applying water can be much more precise than it is now. Some experts report that overwatering is making drip irrigation fall from 90-plus percent efficiency to below 75 or 80 percent. Underwatering can cause the crop's roots to head to an underground drip tube, eventually plugging up the slits.

Soil samples are about the best way to check watering rates, timing, and infiltration. California has a weather network that allows growers to call and receive evaporation rates and the estimated water demand by plants. Local water districts have more information.

Sometimes improper watering can be caused by nonuniform pressure in the field. This can be corrected by adding more pumping capacity or by irrigating the field in smaller sections.

- **Line clogging.** Even with the newer turbulent systems, clogging of emitters still happens, but much less often. Some estimate clogging is reduced 70 to 80 percent with the new drip lines. Clogging can be reduced in other cases by burning back roots and sterilizing the soil with a chemical added in the line.

Fertilizers often promote bacterial growth in the lines. Make sure the fertilizers are flushed from the system by stopping the injector about 30 minutes before turning off the water. Sometimes water residues cause plugging. Growers with high-iron water, for example, can make drip work, but not without a regular maintenance program using dissolving agents in the line. Organic growers with water residues may find drip irrigation is hard to make work without adding chemicals to dissolve deposits.

"I don't see the giant stumbling blocks with drip as I used to," Hartz says. He and other experts are pleased with the newer products and their ability to save grow-

ers water and money. Gary Clark, assistant professor of agricultural engineering at the University of Florida, says he has little doubt that technology exists for growers to benefit from drip irrigation as never before. He says, however, that technology can't replace maintenance. "We give all kinds of recommendations as to what growers should be doing, what types of filters and chemicals they need," Clark says. "But to get a lot of people to incorporate a good maintenance program is hard."

The Grower, March 1991.

Plastic Mulch That Changes Color?

Tomato growers who routinely lay black plastic mulch in the spring, then laboriously strip it away in the summer and lay white mulch may find life a little easier in the future if a recent research project comes to fruition. Clemson (South Carolina) University researchers are in their second year of developing a plastic photodegradable mulch overlay system that changes from black to white during the growing season. Eventually they hope to find the most effective color combination for tomato production. "It's really very simple," said Dennis Decoteau, plant physiologist and project leader, "but it's not been looked at before."

Plastic mulches that photodegrade early or late in the season already are commercially available. But when these mulches break down and the plastic flakes off, the underlying soil surface is exposed, Decoteau said. "What we've done is try to develop one mulch that the grower can use from spring to summer," he said. Researchers are trying to develop a prototype mulch that used black photodegradable mulch on top of a white nondegradable mulch. "As the plastic mulch degrades with increasing exposure to sunlight, the color of the bottom white plastic mulch is exposed," Decoteau said. Different types of photodegradable plastic mulch determine the transition rate and the amount of exposure, he added.

In the spring, most of the fresh market tomatoes now planted in the Southeast are grown using black polyethylene mulch. Black mulch conserves moisture, retards weed growth, and warms the plant's roots. In the summer, the sun can cause extreme heat buildup under the black mulch that can slow the plant's growth. So growers strip off the black plastic and replace it with a white mulch that reflects the sun's rays.

The overlay system would eliminate some costly and labor-intensive tactics some growers have to resort to in changing the color of mulch in the field. Some growers, for example, use a sprayer, paintbrush, or mop to paint the black mulch white with latex paint. Such tactics are expensive, time consuming, and not conducive to large-scale growing operations, Decoteau said. The color-changing mulch also could ease mounting public perceptions that growers are filling landfills with discarded plastic. The biggest drawbacks to using mulch

are removal and disposal. Recyclable and degradable mulches have surfaced as options to solve the disposal problems. But a grower who uses the overlay system only would be applying one layer of mulch, solving half of his disposal problem.

For the first two years of field testing, Decoteau, graduate student Heather Friend, and agricultural engineer Dale Linvill grew tomatoes using four formulations of the photodegradable mulch. Some broke down early and others broke down later in the season. A control group of tomatoes was planted with black mulch that was hand-painted white every 20 days. The researchers found that if they waited two weeks before painting the mulch white, yields were not reduced. "As long as the photodegradable plastic mulch didn't break down any faster than two weeks, it wouldn't affect tomato production," Decoteau said.

Although there was no noticeable difference in yield between the painted mulch and the overlay system, the new system would be more practical, Decoteau added. When tomatoes are harvested in the summer, the white mulch would already be down for the fall crop, saving the grower time and money, he said. Last year the group tested the mulch on squash, but the data has yet to be analyzed. The researchers hope the overlay system will be available commercially in about two years.

The Grower, May 1991.

Characteristics of Corn Types Described

"The corn variety picture has changed the last few years. Improved varieties are coming out," said Ron Garton in introducing his presentation at the Michigan State University Southeast Michigan Sweet Corn School in Ann Arbor on March 2. Mr. Garton gave a run-down on his variety testing and prefaced his results with a description of the three categories of sweet corn that are now available to growers. He is stationed at the Harrow, Ontario, research facility of Agriculture Canada, a federal agency, where he serves as a vegetable specialist. Harrow is near the western end of Lake Erie, southeast of Detroit, Michigan, and the area around it is not dissimilar from southeast Michigan in terms of sweet corn production, Mr. Garton noted.

Sweet corn varieties, he pointed out, fall into one of three classes based on their genetics. Traditional or standard sweet corn is still grown, but it has been largely replaced with the higher-sugar types, including the sugary-enhancer, or se, and the shrunken-2, or sh2, categories, he said. "We don't recommend using many standard-type varieties any more," Mr. Garton said. He added, however, that some still can serve a vital function, since "they have good cold-soil vigor. They're easier to grow than the sweeter types. They give a quick start, so they can be used for the early markets."

The primary disadvantage of the standard types, he said, is that they have rapid sugar-to-starch conversion,

so quality deteriorates quickly if handling conditions are less than perfect. A similar characteristic is typical of se varieties, but at least they start with a higher sugar content, Mr. Garton said. A special gene enhances sugar output in the corn. "Proper handling is important with se corn," he said. "These varieties have a thin pericarp and high eating quality, so we recommend them for local markets especially, but if they're given good handling, they're also good for shipping."

He noted that because of the thin pericarp, seed companies recommend hand-harvest of se varieties. Some growers do mechanical harvesting, "but you have to run the machine slower—you have to match up the ground speed to the variety," he said. Mr. Garton added that se varieties have fair cold-soil vigor, so they are advantageous over sh2 types in that regard. "But still they don't germinate as well as standard sweet corn," he said. Another recommendation, he said, is that se varieties be grown in isolation because some lowering of the sugar content can result if crossing from standard sweet corn or field corn occurs.

The shrunken-2 varieties start with the highest sugar levels, Mr. Garton continued. This type of corn has a gene that raises the sucrose content to more than twice that of standard sweet corn. The dried kernels have a shriveled or shrunken appearance. Along with the high sugar content, he said, the sh2 varieties have a "fairly slow" sugar-to-starch conversion rate, so they're better for shipping long distances.

The major disadvantage of the varieties is poor germination in cold soils, Mr. Garton pointed out. Soils need to be warmed to 60 to 65 degrees Fahrenheit before consistent germination can be expected, he said. The sh2 varieties are also susceptible to seed damage and are subject to damping-off problems, so "you can get poor stands," he said. "The plots need to be isolated from both standard sweet corn varieties and from se varieties," he said. "In addition, birds and raccoons bother sh2 corn more than the other types."

Mr. Garton has tested dozens of varieties from all three categories, "but I don't evaluate white corn much. There's not too much market for white varieties in our area," he said. "And there are so many available varieties now on the market that it's pretty well impossible to test them all."

The Great Lakes Vegetable Growers News,
March 1991.

Your Vegetables Have a History, if Only You Look

A garden abounds in fascinating lore. Each plant has a story, some highly dramatic or amusing, and getting to know them adds a satisfying dimension to growing.

Take arugula, the salad green. The name suggests a recent Mediterranean arrival. But digging in old books, I found that under the name "rocket" it was a favorite

of Queen Elizabeth I and came to America with the Puritans. At various times, this herb was celebrated as a digestive aid, a painkiller, a deodorant, a freckle remover, a cough medicine, a flavoring for preserved meats, and, like many other innocent edibles, an aphrodisiac.

Over the years I've put together a modest little shelf of histories containing such tidbits. I found one of my best books by chance. Browsing in a bookstore, I glimpsed the title of a thick paperback that was gathering dust near the floor. It was *Sturtevant's Edible Plants of the World*. This 685-page volume (Dover Publications Inc., New York) turned out to be a gold mine on the origins of vegetables and their legends or superstitions. Boston-born Edward Lewis Sturtevant, a 19th century agriculturist, touches on 2,897 species, with comments from 560 sources.

Some books may be out of print, but you can get them at your library or through inter-library loans. With luck you may find some in secondhand bookstores to add to your collection. The National Geographic Society steered me to a store that had one of the few remaining copies of *The World in Your Garden*, published by the society in 1957. This is a superb volume containing instructive and entertaining essays on where our plants come from.

One writer in the book, Victor R. Boswell, says he looked at a friend's garden and told him, to his surprise, that the only truly American vegetables he was growing were tomatoes, snap beans, peppers, limas, and potatoes. All the others in his garden were of foreign origin—onions, radishes, lettuce, spinach, beets, chard, cabbage, broccoli, collards, carrots, parsley, turnips, peas, asparagus, soybeans, mustard, and eggplant.

What the colonists found in North America and what they brought with them is beautifully told in Ann Leighton's *Early American Gardens* (Houghton Mifflin Co., Boston, 1970), still available in paperback from the University of Massachusetts Press. Leighton's book profiles the culinary and medical uses of individual plants in that era and contains rich quotations from herbalists of antiquity, like the Greeks, Galen and Dioscorides, and the Roman, Pliny the Elder, and such early English writers as Nicholas Culpepper, John Evelyn, John Josselyn, John Gerard, and John Parkinson.

The Secrets of the Seed by Barbara Friedlander (Grosset and Dunlap, New York, 1974), sparkles with references to quaint customs of the past, such as a girl giving a turnip to a suitor to signify the cold shoulder. And historical bits, like an 1893 ruling of the U.S. Supreme Court that the tomato was a dinner table vegetable rather than a fruit. An importer who wanted to avoid paying duty argued it was a fruit.

A British writer, Alice M. Coats, does a good job profiling flowers in *Flowers and Their Histories* (McGraw-Hill Book Co., 1971). Want to know about petunias? Coats tells us, "The first recorded petunia was *Petunia nyctaginiflora*, a white, sweet-scented,

night-blooming flower which was discovered in Brazil in 1823 by a French commission."

A book I like to browse in is Harold McGee's *On Food and Cooking* (Charles Scribner's and Sons, New York, 1984). McGee's 684-page volume ranges far and wide in history and science. On fruits and vegetables, he deals, among many other things, with tantalizing questions, such as why onions make us cry.

Daily Journal, *Kankanee IL*, January 31, 1991.

Lost Crops of the Incas "Rediscovered"; Offer Exotic Alternatives

At the time of the Spanish conquest in the early 1500s, the Incas—whose empire extended throughout the Andes in South America—cultivated almost as many species of plants as the farmers of Asia and Europe. On mountainsides up to three miles high along the spine of a whole continent and in climates varying from tropical to polar, they grew a wealth of roots, grains, legumes, vegetables, fruits, and nuts.

According to a new report by a National Research Council panel, many of these food crops have the potential to be grown and used in dozens of countries. The report highlights more than 30 different Inca crops with the promise to follow the potato's lead and become important contributors to the world's food supply.

Some of these overlooked foods offer special advantages for developing nations—high nutritional quality and excellent yield, for instance. Many are adaptable to parts of the United States. Indeed, a few already are beginning to be produced commercially in California and Colorado.

According to the report, 31 of the most promising "lost" crops of the Incas include the following:

Arracacha (pronounced ar-a-CATCH-a). This white, yellow, or purple root is described as "one of the tastiest foods to be found anywhere." Its flavor is a blend of cabbage, celery, and roasted chestnuts. A botanical relative of both carrots and celery, it can be boiled, baked, fried, or added to stews. The crop is starting to be cultivated in Puerto Rico, and the roots have become a million-dollar product in recent years and re-exported to Boston, New York, and some other mainland markets.

Ulluco (pronounced oo-YOU-co). These waxy-skinned potato-like tubers can be yellow, pink, red, or candy striped. "They seem like botanical jewels or plastic fakes," the report says. The light-colored flesh, which has a silky texture and a nutty taste, is often boiled, pickled, or used to thicken stews.

Oca. This wrinkled tuber comes in shiny colors from pink to yellow and, depending on variety, tastes from candy-sweet to slightly acid. It has been called the potato that doesn't need sour cream. New Zealanders eat it with roast lamb, while Mexicans eat it raw with salt, lemon, and hot peppers.

Rocoto. This spectacular vegetable looks like a red, orange, yellow, or brown bell pepper, but is pungent like a chile. It is cultivated in the Andes, Costa Rica, and southern Mexico. Despite worldwide fondness for "hot" food, the rocoto so far is unknown outside the Andes, Costa Rica, and Mexico.

Quinoa (pronounced KEEN-wa). This grain is among the best sources of protein in the vegetable kingdom, with up to twice the protein in standard cereal grains and a better amino acid balance. The seeds have a milk flavor and can be ground into flour, prepared like rice, or popped like popcorn. Quinoa is being grown in Colorado, and the grain, flour, and pasta products are available in U.S. health food stores.

Cherimoya (pronounced chair-i-MOY-a). This green-skinned fruit has a creamy, custard-like white flesh that tastes like a blend of papaya, pineapple, and banana. Cherimoya is now grown in California and the fruits can be found in supermarkets and specialty stores in the spring months. Most people eat it fresh, and it is also superb with ice cream.

Pepino. This yellow-and-purple fruit is a relative of the tomato, but tastes like a sweet melon. It has become popular in Japan and New Zealand in recent years. It provides as much vitamin C as many citrus fruits and can be used in everything from salads to desserts. The plant can be grown anywhere that tomatoes succeed.

Copies of the report are available for \$20 from the National Academy Press, 2101 Constitution Avenue, N.W., Washington, D.C. 21418, 202-334-3313 or 1-800-624-6242.

Rural Enterprise, *Winter 1991*.

Bill Courter to Retire

Dr. J.W. "Bill" Courter will retire from the Department of Horticulture of the University of Illinois at the end of September 1991. Bill has completed 32 years in Small Fruit and Vegetable Crops Extension and Research at the University of Illinois. He came to the University in 1959 and was asked to develop an Extension program in extreme southern Illinois. Funds were authorized to build a residence and initiate horticulture research at the Dixon Springs Agricultural Center at Simpson, Illinois.

Bill's program became well known through his work in the National Agricultural Plastics Association, whose newsletter he originated. Courter helped organize the North American Strawberry Growers Association in 1977, served as director from 1980 to 1986, and was appointed newsletter editor in 1991. Bill is widely known to Illinois growers through statewide meetings such as the Illinois Strawberry and Small Fruits School, the Illinois Specialty Growers Convention, and for numerous regional fruit and vegetable schools.

In 1984, Bill was presented with a USDA Service Award in ceremonies in Washington, D.C. The Super-

ior Service Award, the USDA's highest citation, is presented annually to a small group of extension workers from throughout the nation who show outstanding creativity, initiative, and leadership in their work. Professor Courter was recognized for developing and implementing model programs for fresh vegetable and fruit producers, particularly in the pick-your-own marketing area.

In 1990, Courter was recognized as the Outstanding Extension Educator by the American Society for Horticultural Science in Tucson, Arizona. In March 1992, Bill and his wife Treva will assume the job of executive secretaries for the North American Strawberry Growers Association. We wish Bill well in what sounds like a very busy "retirement."

*Adapted from an article in the August 1991,
Illinois Specialty Grower News.*

Asparagus School Organizer Moves On

Carl Cantaluppi, horticulture adviser for the Rock Island County Cooperative Extension Service, has accepted a research and Extension position with Ohio State University. Carl was most well known in Illinois for his Asparagus School, which he developed, and for other vegetable and fruit programming. Most recently, he received the Superior Service Award from the USDA for his work with asparagus production, harvesting, and marketing.

"My horticulture adviser position has been eliminated due to the reorganization of the University of Illinois Cooperative Extension Service, and the only way it would have remained was if the county would have received additional funds," said Cantaluppi, who had been in Rock Island since August 1984. We will miss Carl and his unique programs in the years to come.

Soil Compaction and Tillage Effects on Fresh Vegetable Production

Experiments to evaluate residual effects of past compaction on fresh vegetable production were continued at the research farm of The Ohio State University during 1990. These experiments were conducted on land that was compacted during spring of 1989.

Effects of chisel plowing and no-till systems of seedbed preparation were evaluated for three levels of past compaction. The compaction levels were (a) control, (b) 10 ton axle load, and (c) 17 ton axle load. Variable axle loads were created by using a partly loaded and fully loaded grain cart and driving these on the plots. The grain cart was not used in control. Tillage treatments were imposed in late spring just prior to planting.

During 1989, vehicular traffic was shown to have a drastic effect on the yield of cabbage, the crop grown immediately after the compaction treatment was imposed. The reduction was more severe in no-till than in chisel-plowed plots. The average reduction in cabbage yield of the 10 and 17 ton axle loads over the control was 35 percent in the chisel-plowed and 67 percent in the no-till system of seedbed preparation. Chisel plowing produced about double the yield of the no-till system (23.0 tons vs 11.7 tons per acre). There was no residual effect of compaction for the 1990 crop. However, chisel plowing produced about 11 percent more cabbage than the no-till system during 1990 (18.3 tons vs. 16.3 tons per acre).

Soil compaction had little effect on the yield of tomatoes in 1989, but measurable effect in 1990. There was a reduction of 7 percent in tomato yield in the compacted treatments for chisel plowing, and a reduction of 22 percent in the no-till system. Contrary to cabbage, yield of tomatoes in chisel-plowed treatments was about the same in both methods of seedbed preparation (21 tons per acre). During 1990, however, the yield of tomatoes was low in the 17 ton axle load plot compared with other treatments. The yield reduction was about 23 percent in the chisel plowing and 55 percent in no-till. Furthermore, no-till cabbage produced only 75 percent of that produced by chisel plowing (12 tons vs. 9 tons per acre).

The yield of sweet corn was reduced by compaction during 1989. The average yield of the compacted treatment (mean of 10 ton and 17 ton axle loads) was 41 percent lower than control for chisel plowing and 38 percent lower for no-till. There were no differences in corn yield between the two tillage treatments. For the 1990 crop, compacted plots produced somewhat better yield than the uncompacted control. Furthermore, no-till plots yield about 10 percent more corn than chisel-plowed treatments. Production of fresh vegetables is also being correlated with soil physical properties. The data on soil properties is not presented herein.

In summary, the data supports the following conclusions:

1. Soil compaction can have drastic effects on the yield of cabbage, tomatoes, and corn.
2. The residual effects of compaction are lessened during one year following compaction.
3. Chisel plowing alleviates adverse effects of compaction in cabbage and tomatoes.
4. No-till is a preferred system of seedbed preparation for sweet corn.

Today's Grower, *March 1991.*

Watermelon Recipes for Summer and Fall

The National Watermelon Promotion Board has come up with some original ways to use watermelon.

Three diverse examples follow:

Watermelon Smoothie

- 2 cups seeded watermelon chunks
- 1 cup cracked ice
- 1/2 cup plain yogurt
- 1 to 2 tablespoons sugar
- 1/2 teaspoon ground ginger
- 1/8 teaspoon almond extract

Combine all ingredients in blender container; blend until smooth. Makes 2 to 3 servings.

Watermelon Onion Fresco Salad

- 4 cups cubed watermelon
- 1/2 cup very thinly sliced and quartered sweet onions
- 2 tablespoons chopped fresh basil
- 1/4 cup raspberry and/or blueberry vinegar; salt and freshly ground pepper to taste; lettuce leaves

If seeds are present, remove them from the watermelon; toss watermelon, onions, and basil until well mixed. Pour vinegar over watermelon mixture; toss gently to combine mixture. Season to taste with salt and pepper. Serve on lettuce. Makes 4 to 6 servings.

Watermelon Fire and Ice Salsa

- 3 cups chopped watermelon
- 1/2 cup of green peppers
- 2 tablespoons of lime juice
- 1 tablespoon (each) chopped cilantro and green onion
- 1 to 2 tablespoons (2 to 3 medium) jalapeno peppers
- 1/2 tablespoon garlic salt

Combine all ingredients; mix well. Cover and refrigerate at least 1 hour. Makes 3 cups.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Coming Events

The Illinois Specialty Growers Association Convention and Trade Show will be held January 13 and 14, 1992, at Pheasant Run in St. Charles, Illinois. This will be a new, streamlined version of the convention, featuring a weekend getaway package at the resort and dinner theater at Pheasant Run. It is hoped that the new setting will generate new interest and enthusiasm among exhibitors and growers alike. Promotional literature should be reaching you soon, and a more detailed program will be in the next issue of this letter.

A participatory On-farm Research and Education for Agricultural Sustainability Conference will be held July 30 to August 1, 1992, in Champaign, Illinois. The meeting will be hosted by the University of Illinois College of Agriculture Agricultural Research Institute. For more information contact: Dr. John Gerber, Assistant Director, University of Illinois Agricultural Experiment Station, 211 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801, 217-244-4232.

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL



Illinois Vegetable Farmer's Letter

Greetings! If July picks up where June is leaving off, we may be in for a hot, dry ride. Today, the possibility of our drowning again as we did last summer seems slight.

If your irrigation system is adequate, warm weather crops should be growing very well. Remember, that is why you pay to have irrigation installed. Cool weather crops are probably in trouble or may have already been ruined by the heat.

The news this time is a mixed bag of pending difficulties, conflicting reports, and legislative speculation. But perhaps it will give some insight into what the future will bring to the farm.

1992 production, increased exports over the past two years, and stronger domestic demand spurred by growth in the economy (especially important for food service demand)."

The spring-season area for harvest of fresh-market vegetables, onions, and melons is estimated down 2 percent from a year earlier. "Combined with the 3-percent increase in winter-season area, [the] first-half of 1994 area for harvest is unchanged from a year earlier," according to the report. "[The] spring-season area for harvest in California and Arizona accounts for 44 percent of the total, while areas in Florida and Georgia account for 35 percent." Texas and other states make up the remaining 21 percent.

Excerpted from The Daily Journal, Kankakee, May 5, 1994.

Pesticide Plan to Weigh Economic Impact on Agriculture

An Administration proposal to change how pesticides are regulated will put human safety above economic benefits to agriculture but still weigh the impact of pesticide regulation on farm and food prices in some cases. According to draft copies of the bill, the Administration will carry out its promise to apply new standards for avoiding the risk of cancer from pesticides in food.

The Administration's proposal will apply a "negligible risk" standard for levels of pesticides in raw produce—fruits, vegetables, and other commodities—and for foods processed from those raw commodities. It will also propose that the tolerances, the amount of pesticide residues permitted, take into account the eating habits and special vulnerabilities of infants and children.

The bill also takes into account the impact of exposure from other sources—such as drinking water, home use of pesticides, and exposure in buildings—in setting food tolerances. That provision will draw praise from environmentalists seeking a more comprehensive look at pesticide exposure but raises doubts about the practicality of measuring those exposures.

Moreover, in setting the tolerances, the Administration will define benefits as those that occur "when the application of a pesticide chemical residue to a food directly reduces the incidence of illness or disease." Currently, the phrasing "does not include benefits from an adequate, wholesome, or economical food supply"

Vegetable Production to Rise 12 to 14 Percent

Contract acreage for the five leading vegetables grown for processing is expected to increase 12 percent this year to 1.5 million acres under cultivation, according to USDA's Economic Research Service. The five crops are tomatoes, sweet corn, snap beans, green peas, and cucumbers used for pickles. "The increase follows a decline in planted acreage a year earlier." Green peas are expected to lead the increases with 34 percent, tomatoes 9 percent, and sweet corn 9 percent. Cucumber acreage is expected to be up only 1 percent, due to above-average inventories of pickles.

"Given average yields, production for the five major vegetables processed could [then] rise 12 to 14 percent from the 14 million short tons of a year ago," the report said. Tomato processors and growers are expected to contract for 342,650 acres this season, up 9 percent. The previous year there was a 14 percent increase. "California's contract acreage is 13 percent higher, while acreage for all other states is down 16 percent."

"U.S. tomato acreage increased this season, reflecting higher wholesale prices for tomato products and a return to generally normal inventory levels. Inventories were reduced from burdensome levels [because of] lower



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

can be used to weigh such things as impact on food prices and supply in determining the amount of pesticide residues permitted on raw agricultural commodities.

A "zero tolerance" standard now exists for processed foods, meaning no trace of a potentially cancer-causing chemical can be allowed. Elsewhere, the Administration proposes to give the USDA a chance to comment on any proposed decision by the Environmental Protection Agency to revoke permission to use a pesticide.

Also, any proposal to deny permission to use a pesticide must carry a statement giving a "general analysis of the impact of the proposed action on consumers, retail food prices, production of agricultural commodities, and otherwise on the agricultural economy." The proposal also tells the EPA administrator to consider "restricting a pesticide's uses or use as an alternative to cancellation."

The proposal has met criticism from the food industry. Steve Ziller, vice president for scientific and technical affairs at the Grocery Manufacturers of America, feels that the proposal has a "number of 'fatal' flaws." The proposal fails to make the system nationally uniform, making it possible for states to enact stricter regulations, he said. Also, his group and others in the food industry object to the proposal to give the Food and Drug Administration authority to embargo and recall products.

Excerpted from The Sunday Journal, Kankakee, April 24, 1994.

Pesticides in One-Fifth of Tested Public Wells

Agricultural pesticides were detected in 21 percent of groundwater supplies tested in Illinois last year, according to the Environmental Protection Agency. The levels are not in amounts sufficient to trigger public health action by the EPA, but the findings are significant in social terms, according to the EPA's A.G. Taylor, an agricultural specialist who directed the study.

He advises farmers to continue efforts to reduce and eliminate chemicals because the public is intolerant of any level of contaminants in their water supplies—even levels considered to be minuscule or well below the point of public health concern.

Supplies at Beaverville and Clifton are among 32 public water supplies where pesticides were detected. Tests took place at 150 public groundwater supplies across Illinois from January through June last year, Taylor explained during an annual pesticide conference.

At Beaverville, the chemical 2,4-D, a component in "Agrosect," "Salvo," or "Weed Be Gone," was found. The chlorinated hydrocarbon herbicide was found at 0.11 parts per billion. The rate that triggers action by the EPA is 70 parts per billion — 700 times the amount detected.

At Clifton, atrazine levels were detected at 0.14 parts per billion. The trigger for action is 3 parts per billion—21-1/2 times the amount detected.

"These are barely a detection," Joan Muraro, spokeswoman for the state EPA said today. "You'd have to drink two liters of contaminated water every day for 70 years. Even then, your chances of getting cancer increase by one in a million or one in some other [large] number, depending on what type of chemical it is."

Muraro added that one part per billion is the equivalent of 1 cent out of \$10 million. "Until recently, it wasn't possible to measure that accurately. We can now measure to the trillionth and that may be why we're seeing this now."

Taylor found the test results surprising because chemicals were detected in only six of the same groundwater supplies during similar checks between 1984 and 1992.

Under federal rules, 1,259 Illinois groundwater sources will eventually be tested for farm chemicals over three years. If the average of four quarterly tests exceeds the threshold for certain pesticides, communities must find a remedy. No groundwater supply has flunked so far.

Taylor said atrazine was found in 22 of the 32 samples that had chemicals. The popular weed killer, which has caused health problems in experiments with animals, is applied to as much as 80 percent of the state's corn crop. "Farmers could sustain a significant economic hardship if atrazine were no longer available," said Ronald A. Hines, a researcher at the University of Illinois.

The groundwater samples are the second leg of statewide tests. In 1992-93, the state examined 129 surface water sources, such as rivers, lakes, and reservoirs, that provide drinking water. Ten sources failed the federal limit for atrazine, and local officials are working with the EPA to cure the problem.

In an interview, Taylor predicted that farmers are likely to face further regulation if they fail to control chemicals. A jittery public will demand action. "[Consumers] are not toxicologists. They cannot be expected to understand the risk of exposure. If we have a perpetual apprehension [when] people go to the water faucet, the apprehension is a subtle form of sickness itself."

Excerpted from The Daily Journal, Kankakee, January 7, 1994.

Groups Petition to Block EPA's Ban on Fumigant

Groups petitioning the U.S. Court of Appeals to block the Environmental Protection Agency's ban on methyl bromide hope to persuade the court that the agency acted before all the facts were in. "There are still a lot of studies being done," said Blake Biles of Arnold and Porter, the law firm representing the petitioners.

Petitioners include, among others, the Great Lakes Chemical Corporation, the Ethyl Corporation, the Western Growers Association, Taylor and Fulton, the National Watermelon Association, the Port of Philadelphia, and the California Fresh Carrot Advisory Board.

The EPA classified methyl bromide as a Class I ozone depleter under the Clean Air Act, which means its uses must be banned. The petitioners are arguing that the classification is premature and that studies may show that methyl bromide's impact on the ozone is much less.

Biles said he is aware that President Clinton made promises about trying to keep methyl bromide in use when he was seeking votes from the Florida delegation to pass the North American Free Trade Agreement (NAFTA).

He said, however, that the petitioners—manufacturers and users—still need to pursue action in the Court of Appeals. "We are asking the court to make the EPA rescind its rule." The major U.S. manufacturers of methyl bromide have formed the Methyl Bromide Working Group to keep the compound in use. The group is working with agricultural users and government agencies in conducting further research on the environmental impact of methyl bromide.

Biles cited the economic impact from a loss of methyl bromide. Since there are no economical substitutes, a huge portion of international trade in produce would be cut without the fumigant. In many cases, countries require that produce shipments be treated with methyl bromide as a part of plant quarantine procedures.

Biles said he doubts the court will rule quickly. He said such a petition could take many months before there is a ruling.

Excerpted from The Packer, Shawnee Mission, Kansas, February 19, 1994.

Chlorine Now Under Assault

Now there is one more chemical to worry about, only this one is perhaps the most widely used element of all—chlorine. Chlorine is used in 85 percent of pesticides and

98 percent of water purification treatments; it is also a major "building block" of plastic and packaging and is used in a host of other products and chemical processes. The chemical industry claims that it would cost billions of dollars to find an alternative to chlorine. The Chlorine Chemistry Council, which is opposed to any ban on the chemical, said that produce costs would rise without chlorine-based pesticides.

However, certain groups have targeted chlorine as a threat, including Green Peace, World Watch, the Natural Resources Defense Council, and the American Public Health Association. Chlorine has been linked to higher breast cancer risk in women and to birth defects. "The women's health issues have motivated many organizations to oppose chlorine," acknowledges Brad Lienhart of the Chlorine Chemistry Council. Lienhart, who spoke April 28 at the spring meeting of the National Agricultural Chemicals Association, claimed "no clear clinical evidence about these perceived health threats." Still, Carol Browner, administrator of the Environmental Protection Agency, said the agency will take a close look at chlorine. Because chlorine is so much a part of chemical products, Lienhart said he sees trouble ahead: "As the debate on chlorine chemistry goes, so goes all our chemicals."

Excerpted from The Packer, Shawnee Mission, Kansas, May 9, 1994.

Crop Insurance Reform Bill Introduced

An Administration plan to increase farmer participation in the Federal Crop Insurance Program and discourage the off-budget funding of disaster aid was introduced in the House Thursday by Committee Chairman Kika de la Garza, D-Texas; Environment, Credit, and Rural Development Subcommittee Chairman Tim Johnson, D-South Dakota; and Representative David Minge, D-Minnesota. "The need for reform in the way the federal government provides risk-management assistance to our farmers has never been greater. The current system is simply not working as well as we would like," Representative de la Garza said.

The crop insurance program currently offered by the federal government suffers from chronically low farmer participation. For every \$1 collected in premiums since 1981 by the Federal Crop Insurance Corporation, the U.S. Department of Agriculture agency that administers the program, \$1.47 is paid out in claims. One of the major factors said to contribute to low participation and the poor performance of the crop insurance program is the avail-

ability—or at least the probability—of emergency disaster payments being appropriated by Congress. Over the past six years the federal government has funded an average of \$1.5 billion annually in ad hoc disaster payments to farmers.

“It is obvious that crop insurance and ad hoc disaster assistance work at cross purposes. It should also be obvious that adequately funding two separate risk-management programs will become more and more politically difficult given the budget pressures facing Congress,” said Representative de la Garza. The comprehensive reform package introduced is designed to make crop insurance the primary risk-management tool for farmers. Included in the Administration’s proposal and the introduced bill (H.R. 4217) are legislative and budget changes to discourage off-budget funding of ad hoc crop disaster legislation.

Excerpted from the Committee on Agriculture, U.S. House of Representatives, April 14, 1994.

Raw Produce Not Always Best Choice

Some foods served raw—like eggs, oysters, or beef—can be risky, even deadly, because of the bacteria they contain. Raw fruits and vegetables, however, are generally thought to be superior to cooked produce because they pose little risk of food poisoning, have not suffered nutrient losses from cooking, and contain beneficial food enzymes.

No one would argue that cooking, especially overcooking, destroys vitamins, but do raw fruits and vegetables really offer health benefits not obtainable in cooked form? Plenty of people seem to think so. The fervent belief that raw is better appears to be the force behind the success of one Atlanta-based restaurant chain, Delights of the Garden, where only raw, vegetarian fare is served. The company, with one restaurant in Atlanta and two in Washington, expects to expand to New York City and Philadelphia.

One of the most appealing and popular theories about raw foods is as follows: raw fruits and vegetables contain enzymes needed by the body to function properly, and eating produce that has been processed in any way puts a digestive strain on the body. As a result, raw-food enthusiasts say, the organs become exhausted, leaving the body susceptible to disease infection, high blood pressure, thyroid disorders, and obesity.

However, according to Paul LaChance, chairman of the food science department at Rutgers University, the enzymes in raw foods rarely survive the acid environment of the stomach. Even if food enzymes could survive the

stomach, pass into the intestines, and be absorbed into the bloodstream, it is not clear that they would have health benefits.

Barry Swanson, professor of food science and human nutrition at Washington State University, agreed. “The theory that cooking inactivates essential enzymes is sketchy at best. In many cases, cooking is beneficial.”

While raw foods do not provide special disease-preventing enzymes, they can offer more nutrition than cooked foods. That is because cooking triggers some loss of heat-sensitive nutrients like the B vitamins and vitamin C. “Cooking fruits or vegetables,” LaChance said, “can destroy as much as 50 to 55 percent of these heat-sensitive vitamins.”

Raw produce, if stored or handled improperly before serving, can suffer similar nutrient losses. Donald Downing, a professor of food processing in the Department of Food Science and Technology at Cornell University, said that most losses of food nutrients are caused by improper handling, such as keeping food so long that the vitamins are destroyed.

What about minerals? “You can’t really destroy a mineral,” LaChance said, “but you can lose it through leaching into the cooking water.” That is why nutritionists recommend that vegetables be cooked for a short time in a small amount of water, and that the cooking liquid be re-used in sauces, gravies, or soups. By recycling the cooking liquid, minerals and vitamins that have leached into the water are salvaged.

There’s a nutrition paradox here: besides wiping out some heat-sensitive vitamins, cooking frees other trapped nutrients, like beta-carotene, actually making them more available to the body than they are from raw food. “In raw foods, beta-carotene and other carotenoids don’t always get released from inside the fibrous walls of plants, and that stays in your gastrointestinal tract and acts as bulk,” LaChance said.

Discussing which is better, raw or cooked, he added, “It becomes six of one and half a dozen of the other. Some nutrients are lost from cooking; others are increased.”

Excerpted from The Champaign-Urbana News Gazette, April 6, 1994.

The “Little Tomato”: A Specialty Celebrity

Is the tomato a fruit or vegetable? Better yet, is the tomatillo a fruit or vegetable? The age-old debate as to whether the tomato is a fruit or vegetable spills over to the tomatillo, which comes from the same family. Since both

items develop from flower tissue, the correct answer is that both are fruits.

A member of the *Physalis* genus, the tomatillo is becoming more of a permanent member of the produce department, according to retailers and marketers. Although the “little tomato,” better known by its Spanish name, tomatillo, is considered a specialty produce item by most retailers, it is nevertheless a staple of the specialties category.

The tomatillo is easily recognized because of its thin, transparent husk, which surrounds most of the smooth outer body. The husk gives the fruit the appearance of a green “Chinese Lantern.” Actually, the husk is an enlarged calyx or outer covering of the tomatillo flower. Well known in the Hispanic community, the tomatillo is the main ingredient in salsa verde, a green salsa offered with many Mexican dishes.

Most stores display tomatillos between the chile peppers and jicama and near the cilantro. These are additional salsa ingredients for ethnic shoppers. To ensure consistent supply and drum up additional business, cross-merchandise tomatillos with other salsa and Mexican-recipe ingredients. This item is growing in popularity because of the success of southwestern cuisine in so many restaurants throughout the country, as well as the popularity of Mexican recipes.

The specialty market sells tomatillos in a traditional 10-pound carton, as well as 89-ounce consumer packs, complete with instructions for those new to the fruit. Such packaging helps retailers educate shoppers about this exotic item that has gained popularity in the past decade. It also tempts curious and health-conscious consumers to experiment with unfamiliar items. Grown year-round in northern Mexico, mostly in the states of Culiacan and Sinaloa, the tomatillo is also cultivated in California from June through October and may be grown successfully like tomatoes and peppers in Illinois. The fruit grows on an upright vine similar to the traditional tomato and is harvested by hand.

There is heavy demand around the United States for this item in areas which have strong Latino populations. However, the tomatillo is making its way into more mainstream markets.

Industry reports indicate the tomatillo’s growing popularity. Founder Frieda Caplan and president Karen Caplan of Frieda’s Inc. note that the tomatillo is a hot seller. The Los Angeles-based specialty marketer’s list of top sellers shows that the tomatillo moved from nineteenth place in 1992 to thirteenth place a year later. Frieda’s annual ranking, measured in cases sold each year, indicates how quickly the staple specialty item has risen.

Ethnic holidays may be encouraging more consumption, marketers say. After Cinco de Mayo, Mexican Independence Day, sales of tomatillos continue to rise and remain strong throughout the summer. “We believe some of the increased movement we’re realizing is directly related to the increases in the U.S. Latino population,” says Kathleen Marron, spokesperson for World Variety.

Allan Eishenour, manager of produce operations at Fleming Company’s Oklahoma City Division, says that he has tomatillos available to wholesale grocers 365 days of the year. “We prepare ads for tomatillos every two or three months. We find the movement is on the upswing.” A typical advertisement prepared by Fleming for its independent IGA customers might run tomatillos at \$1.29 a pound.

Budget Food Market, an independent Oklahoma City store, goes a step further. “We advertise tomatillos on the radio in Spanish for our Latino customers, who may not be attracted by our English language weekly ads,” says produce manager Russel Gardner. The fruit is also featured in store advertisements every two months or so. Movement is constant, with increases during such seasons as Thanksgiving and Christmas.

Tomatillos typically are merchandised in specialty produce sections—along with chile peppers, Japanese eggplant, and fresh ginger, and are often sold by the pound, with stems still intact. The green globes offer an attractive contrast of paper covering and smooth skin. The tomatillo is freshest when the paper-thin husk still is moist. The fruit has good shelf life—often weeks, experts say. With such keeping qualities and ethnic draw, the tomatillo should draw fruitful sales.

Excerpted from The Packer, Shawnee Mission, Kansas, May 30, 1994.

Garlic History

For centuries legendary properties have been ascribed to garlic, ranging from repelling vampires to curing common ailments. In ancient gardens where vast stores of medicinals were grown, garlic was like aspirin—a basic necessity.

If in modern times it has lost much of this mythical prestige, garlic continues to be prized for its culinary attributes. Despite its standing in the kitchen, however, garlic is not so highly regarded in the garden. It never makes the list of the top 20 most popular vegetables in garden surveys. Perhaps this is because it is easy to find in stores and because most people use so little of it at a given time that they see little need to grow it. This is unfortunate; although garlic must be in the ground nine months

before harvest, it is easily grown, takes up little enough space, and has few pests. More important, it has begun to acquire renewed status as a pest deterrent, an important quality for a plant grown in an organic environment.

There are several subspecies of garlic. Common garlic of the kind you see in most supermarkets comes in two types—hard-neck and soft-neck. Hard-neck garlic grows in cloves that surround a hard, brittle interior stalk that was the stem to the “flower” that developed a cluster of bulblets a few weeks before harvest. Soft-neck garlic is also called “artichoke” garlic to describe its growth habit of overlapping cloves that form the entire bulb, alone, with no interior stem.

A third kind is the highly prized gourmet garlic popularly known as “elephant” garlic for the enormous cloves, some as large as an entire head of standard garlic. Elephant garlic actually belongs to another branch of the vast allium family, of which standard garlic is a member—as well as onions, leeks, and many beautiful flowers. Standard garlic and elephant garlic are distant cousins; the larger variety is closer horticulturally to leeks, which may account for its additional reputation as the “mild” garlic.

Nancy Gripp, president of the Virginia Garlic Festival Association, says the key to really great garlic, in size and shape as well as flavor, is planting time and soil preparation. “Garlic is a bulb,” notes Gripp. “People are always making the mistake of planting it in the spring. You don’t plant a crocus or a tulip in the spring. . . . Plant [garlic] in the fall; it needs winter to establish itself.”

If garlic “seed,” which is nothing more than a perfect head of cloves, is difficult to find in the fall, supermarket garlic is acceptable as seed stock. Many supermarkets also sell elephant garlic, which can be used to grow new bulbs.

Plant only cloves that are large and well formed; the small, inner cloves should be discarded or used in the kitchen. There is a direct relationship between the size of the clove and the size of the bulb it will produce.

Excerpted from The Daily Journal, Kankakee, December 2, 1993.

Apples and Onions Protect Against Heart Disease

Apples and onions may reduce the risk of death from coronary heart disease and the chances of having a first heart attack, according to research published last year. Dutch doctors, reporting in the British journal *The Lancet*, said certain produce items have a high content of the naturally present chemical antioxidants known as flavonoids. Researchers carried out a five-year study of 805

Dutch men between 65 and 84 whose main source of flavonoids in their diet were apples and onions, according to Reuters.

Excerpted from The Packer, Shawnee Mission, Kansas, November 27, 1993.

Test Your Spice IQ Without Tasting

A spice and herb chart posted in your cupboard proves handy when you are flavoring a dish, but do not let it limit your creativity. Once you feel comfortable with the classic seasoning combinations, try something different. For example, pair dill and nutmeg in a cheesy pasta sauce, or ginger and fennel seed in a meaty soup. Just for fun, test your spice IQ below.

- Which is the world’s most expensive spice?
a) basil; b) saffron; c) anise.
- Vanilla is the fruit of what plant?
a) poppy; b) orchid; c) carnation.
- The favorite spice used in pizza is?
a) coriander; b) fennel; c) oregano.
- The spice identifiable by its licorice flavor is?
a) anise; b) clove; c) cinnamon.
- It’s the bark of a tree and one of the oldest spices known.
a) ginger; b) cinnamon; c) cloves.
- It’s part of the nutmeg plant but is also a spice.
a) mace; b) allspice; c) coriander.
- What spice was used to crown the Greek athletes?
a) cardamom; b) basil; c) bay leaves.
- This herb is also known as Chinese parsley.
a) cilantro; b) coriander; c) basil.
- This is called the “Queen of Spices.”
a) savory; b) thyme; c) cardamom.
- What is the world’s most popular spice?
a) garlic; b) red pepper; c) black pepper.

Answers: 1. b) saffron; 2. b) orchid; 3. c) oregano; 4. a) anise; 5. b) cinnamon; 6. a) mace; 7. c) bay leaves; 8. a) cilantro; 9. c) cardamom; 10. b) red pepper.

Excerpted from The Daily Journal, Kankakee, October 27, 1993.

Illinois Herb Association Field Day

The Department of Horticulture at the University of Illinois, Urbana-Champaign, will host the second of two 1994 summer field days of the Illinois Herb Association

on Saturday, August 27. The program will run from 9 a.m. until 4 p.m., and will feature a variety of talks about the business of herbs. Tours of the new Hartley Garden trials will be available. Lunch will be provided as part of the registration fee. For further details, including the complete program, directions on campus, and exact registration fee, write to Charles E. Voigt, W-425 Turner Hall, 1102 S. Goodwin Ave., Urbana, IL 61801, or call him at (217)333-1969.

Publications Available

Here are some new publications that are available from Carl Cantaluppi at the address below:

Bulletin 826, "Asparagus Production, Management, and Marketing." This 25-page bulletin covers site selection, soils, varieties, male hybrids, planting techniques, white asparagus production, harvest preparation, harvesting, yields, handling, grading, storage, weed, insect, and disease control, costs, marketing, estimating spear growth, and estimated costs and returns of asparagus production. Price is \$6, including postage.

Proceedings of the 1994 Ohio Asparagus, Strawberry, and Small Fruit Schools. This 124-page item includes the speakers' presentations and marketing information for those who would like to learn about the growing and marketing of these high-value crops. Small fruit topics include raspberries, blackberries, grapes, and blueberries. Cultural practices, varieties, yields, harvesting, insect, disease, and alternate weed-control strategies are discussed. Price is \$7, including postage.

The 1994 North Central Weed Control Guide for Vegetable Crops. This 31-page guide covers the legally labeled herbicides for vegetable crops used in the following states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. Price is \$2, including postage.

The 1994 Commercial Small Fruit and Grape Spray Guide. This 34-page guide covers insect, disease, and weed control materials and spray schedules needed for those who grow small fruits. This publication can be used in the following states: Illinois, Kansas, Ohio, Iowa, Kentucky, West Virginia, and Indiana. Price is \$2, including postage.

Please make your check or money order **payable in U.S. funds** to "The Ohio State University" and send to Carl J. Cantaluppi, Research and Extension Horticulturist, The Ohio State University, Piketon Research and Extension Center, 1864 Shyville Rd., Piketon, OH 45661-9749.

Recipes for Your Customers

Old-Fashioned Corn Pudding

- 2-1/2 cups fresh corn kernels scraped from the cob (4 large ears)
- 1 cup light cream
- 1 tablespoon sugar
- 1-1/2 teaspoon salt
- 1/4 teaspoon white pepper
- 3 tablespoons butter, melted
- 5 eggs, beaten, or use a combination of half egg, half egg substitute
- 3 cups low-fat milk
- 1 tablespoon cornstarch
- 1 tablespoon cold water

Preheat the oven to 350°F. Generously butter a shallow 2-quart baking dish.

Cook the corn kernels and cream in the top of a double boiler for 10 to 20 minutes to reduce slightly. The cooking time will depend on the moisture content of the corn. Stir often to prevent sticking. This should produce a thickened, creamy mixture. If it starts to dry out, add a little more cream; if there is too much liquid, cook a little while longer.

Measure the corn-cream mixture. If you have less than 2-1/2 cups, add a bit of cream to make up the difference. Set aside to cool for about 15 minutes.

Combine the cooled corn mixture with all the other ingredients, except the cornstarch and water. Mix the cornstarch and water to make a paste; stir into the other ingredients, combining well. Pour into the baking dish. Cook until firm, about 1 hour. Serves 6 to 8.

Per serving: 349 calories, 12g protein, 23g carbohydrates, 2.7g fiber, 17g total fat (10g saturated), 671 mg sodium. (Reprinted from USA Weekend, August 20-22, 1993.)

Herbed Vegetable Kabobs

- 3/4 cup olive oil
- 1/4 cup balsamic vinegar
- 1 tablespoon chopped fresh basil leaves*
- 1 tablespoon chopped fresh rosemary*
- 1 tablespoon chopped fresh thyme*
- 1/4 teaspoon salt
- 1/4 teaspoon ground black pepper
- 1 medium red onion, cut into eight wedges
- 1 medium red bell pepper, cut into eight chunks
- 1 medium zucchini, cut into 1-inch slices
- 2 ears corn, cut into 3/4-inch slices
- 8 large fresh mushrooms

Combine olive oil, vinegar, basil, rosemary, thyme, salt, and pepper in medium bowl. Place onion, red pepper, zucchini, corn, and mushrooms in plastic bag with zippered closing; add olive oil mixture to bag. Seal; shake or turn bag to coat. Marinate in refrigerator 2 to 4 hours.

Remove vegetables from marinade; reserve marinade. Thread vegetables onto 8, 10-inch skewers. Grill or broil 4 to 5 inches from heat, turning, and basting with reserved marinade, 10 to 15 minutes, or until vegetables are tender. Makes 4 servings.

* Substitute 1 teaspoon dried herbs for 1 tablespoon fresh herbs, if necessary.

Each serving provides 166 calories, 3g protein, 11g fat, 17g carbohydrate, 3.2g dietary fiber, 0 mg cholesterol and 46 mg sodium. (*Reprinted from The Daily Journal, Kankakee, November 3, 1993.*)

Zucchini with Scallions

1 tablespoon olive oil
8 cups shredded zucchini
1 cup sliced scallions, including white and green
Salt and freshly ground black pepper
6 large basil leaves

In a large skillet, heat olive oil over medium-high heat. Add zucchini and scallions. Cook, stirring occasionally, until vegetables are tender, about 15 minutes. Season to taste with salt and freshly ground pepper. Stack basil leaves. Roll stacked leaves, starting from the stem end. With a sharp knife, thinly slice rolled leaves by cutting across them to make fine shreds. Sprinkle shredded basil over the cooked squash. Mix just until blended. Turn into a serving bowl. Serve immediately. Makes 4 servings. (*Reprinted from The Daily Journal, Kankakee, September 22, 1993.*)

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
at Urbana-Champaign
1301 West Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Welcome to the final installment of the *Illinois Vegetable Farmer's Letter*. As announced in the last issue, this newsletter will not be continuing into the new year. Due to increased printing costs, this will also be a somewhat shortened issue. If anyone out there has an idea of another efficient, cheap way to supply information to this audience, please forward it here. We will try to implement good ideas, if time and funds allow. In the meantime, so long, it's been good to know you.

Illinois Specialty Growers to Hold 1996 Convention in Decatur

On January 6-9, 1996, the Illinois Specialty Growers Association will sponsor a 4-day conference in Decatur at the Holiday Inn Conference Hotel. Activities include a Small Acreage Seminar, Herbal Bazaar, and Specialty Growers' Convention and Trade Show.

Part I. Small Acreage Seminar (January 6, 10 a.m. - 4:30 p.m.). A new edition to this year's program is a seminar entitled "Putting Small Acreage to Work." Landowners, growers, and the public can explore opportunities for alternative production on small acreages. Successful growers as well as university personnel will suggest new ways for farmers to use small acreages to earn a living, make a second income, ease the move into retirement, and tap into niche markets. Through breakout sessions, panel discussions, and lectures, participants can learn how to succeed with specialty crops such as shiitake mushrooms, small fruits, grapes, herbs, sweet corn, tomatoes, peppers, ginseng, pumpkins, melons, and small scale orchard systems. There is also an all-important session on marketing *before* you plant. The program is targeted for people who have a small tract of land and are looking for ways to utilize it productively.

Part II. Herbal Bazaar (January 6-7, 10 a.m. - 5:30 p.m.). If you are an herb enthusiast or craft lover, the Illinois Herb Association's Herbal Bazaar is for you. Herb and dried flower producers, artisans, crafters of these and other plant materials, vendors of equipment

and supplies for herb and floral work, and sellers of other herbal products will have their wares available for sale. The 2-day retail show will feature two full slates of lectures, one for beginners and another for experienced herbalists, and fee workshops for everyone. You can surely cure your cabin fever this January by learning more about herbs from some of the nation's finest herbalists. Take in a workshop, attend a lecture, shop at the Herbal Bazaar, or do it all—there is something for everyone.

Part III. Specialty Growers' Convention and Trade Show (January 6-9). Attendance, aimed primarily at irrigators and fruit, vegetable, herb, ginseng, and Christmas tree growers, is hoped to total 1,500 people. Please do your part and attend this year. Some of you are faithful participants, but overall numbers have been eroding over the last several years. A lot of work goes into making these educational and business opportunities available, and the job of assembling a creditable show becomes harder as the number of conference attendees dwindles. Help us keep this show big, exciting, and useful by taking the time to attend.

Amy Barr will keynote the conference with her presentation entitled, "Major Consumer Trends Affecting the U.S. Food System." Other educational programming will be highlighted by Dr. John Inman, University of California, who will examine new equipment technology for the progressive vegetable grower; Dr. Richard Marini, Virginia Polytechnic Institute, giving new perspectives on pruning and training apple trees for maximum yield and color; Dr. Diana Lange, Southwest Purdue Agricultural Program, discussing quality control in the marketing of fresh fruits and vegetables; Gary Bullen, University of Illinois Cooperative Extension Service, discussing the economics of irrigation and leasing arrangements; W. Scott Persons, nationally recognized expert and author on ginseng, explaining how to grow ginseng in its native woodland habitat; and Bob Scott, owner of Prairie Pines, giving some of his successful methods of promoting the sale of Christmas trees.

Additional general subject areas for educational sessions include improving stand establishment of vegetables, better tomato production practices, pruning and training apple trees, weather monitoring for prediction of disease and insect activities, strategies for thinning apples and peaches, special fertility considerations on irrigated sands, making appropriate displays for your roadside market, and cultural practices best suited for Christmas tree production.



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

Highlights of another star-studded herb program include Don Haynie, Buffalo Springs Herb Farm, Raphine, Virginia, on finding and building an herb business; David Gilson, president of the International Herb Association in Mundelein, Illinois, on greenhouse growing of herbs; Ralph Cramer of Cramer's Posie Patch in Elizabethtown, Pennsylvania, explaining how to control weeds in field production of everlasting flowers; Daniel Gagnon, of Herbs, Etc. in Santa Fe, New Mexico, bringing us up to date on the state of herbal medicine in the United States today; Jane Hogue, of Prairie Pedlar in Odebolt, Iowa, explaining the joys of bringing children into the herb garden; and many, many more!

The guru of herbs in America, Adelma Grenier Simmons, will again share her wealth of knowledge and experience with all of us. Her myriad books and brochures will be available for sale. We are most fortunate to have Mrs. Simmons at our convention, and each person who meets this lady will leave with a new love and knowledge of herbs. As you travel around the country, you eventually find that an amazing number of herbal businesses were, in fact, inspired by visits to her Caprilands Farm in Coventry, Connecticut, and by personal contact with this living legend of herbs.

In addition to the wide range of educational programs, the convention will feature a large trade show with approximately 125 exhibits. Special attractions include a cider-judging contest on January 8 and a reception that same evening, both sponsored by the Illinois State Horticulture Society. Exhibitors and attendees will be able to mix business and pleasure with good food.

On January 9, an appreciation luncheon will be held to recognize outstanding leadership in the horticultural industry. Thomas W. Ewing (R), U.S. Representative from the 15th Congressional District of Illinois, has been invited to keynote the noon luncheon. Congressman Ewing currently serves on the House Committee on Agriculture and is the Chairman of the House Subcommittee on Risk Management and Specialty Crops.

"The convention will also give growers an opportunity to network with producers from other states, to find out what problems they are facing, and to see what they might have in common," said Lowell Lenschow, manager of the Illinois Specialty Growers Association.

To register for the conference, or for more information, contact Lowell Lenschow, convention manager, 1701 Towanda Ave., Bloomington, Illinois 61701. Phone: (309)557-2107, Fax: (309)557-3729.

Awesome Fungus

It was a ghastly image Ken Deahl saw under his microscope in Beltsville that day. Alive and well in the

slice of a rotten potato was a direct descendant of the blight that caused Ireland's "An Gorta Mor"—the Great Hunger—and the microbe was in the United States. The potato from Washington state arrived on his desk at the U.S. Agricultural Research Center in the fall of 1990 with a note saying that no pesticide had been able to save it.

On the 150th anniversary of the first reports of the blight in the Irish press, in September 1845, the potato blight is back. The new strain is threatening to cause famine in underdeveloped countries and raise potato prices in the United States, where it already has cost farmers at least \$200 million. "Internationally, it's the worst to hit since the blight that hit Ireland back in the 1840s," said Deahl, an Irish-American who has been researching potato blight since 1980. "In a lot of ways, it seems to be a case of history repeating itself."

The blight appeared in Ireland about the same time landlords were clearing peasant farmers off lands to make way for dairy farms, according to Robert J. Savage, a professor of Irish history at Boston College. An estimated 1 million people died of starvation; and another 1.5 million fled, most to the United States and Canada. Ireland's population dropped from 8.5 million in 1845 to 6 million in 1851. Among the immigrants was Deahl's great-great-grandfather.

Deahl, who has a doctorate in microbiology, and his staff of 10 at the vegetable lab at the Beltsville Agricultural Research Center have been searching for a sort of "silver bullet" variety by cross-breeding potato seedlings from farms around the world in hopes of finding a combination resistant to the blight.

When he sliced a piece of the potato from Washington and put it under his microscope, it was as if he had seen a ghost. "I thought, 'Oh boy, it's really here,'" he recalled. "I was astounded." Before that, he and other plant pathologists believed that crops could be protected by spraying with Ridomil, a fungicide that had been effective. The strain of blight resistant to the spray, known as A2, was thought by experts to be confined to Central Mexico, but the evidence they were wrong is everywhere in Deahl's lab—from the autopsylike photos of infected potatoes in a file drawer to the mortuary of sorts he has set up. On the lab's shelves are 1,400 test tubes, each filled with samples of the fungus that destroyed a potato farm somewhere in North America.

The new strain of blight first appears as a small, yellow lesion that infects the potato plant, transforms quickly into a cottony growth, and produces spores that become airborne and may travel hundreds of miles to infect other plants. One infected potato plant can quickly spoil thousands of others, turning a field of potato plants into rotting foliage in a few days.

No one is sure how the new strain escaped from Mexico. Most scientists believe it probably came north on

a potato or a tomato plant, which also can be infected. They are sure of one thing, however. It is spreading.

Deahl believes that some relief may be in sight. His lab should be able to offer a resistant breed of potato to growers and seed producers in the next 2 to 3 years. This new breed will alleviate the damages caused by the fungus, but will never eradicate it, Deahl said. "It's an awesome fungus, just awesome. It's here to stay."

Excerpted from The Sunday Journal, Kankakee, September 17, 1995.

A Whole Lotta Cabbage!

Cabbage puts more of the crunch into Americans' diets than any other cruciferous vegetable—including broccoli, cauliflower, or brussels sprouts, according to the United States Department of Agriculture. (Cruciferous vegetables are members of the mustard family—a group of increasing popularity lately for its reputation as a cancer-fighting food.)

Cabbage consumption in this country has declined since the 1940s, mostly because of competition from other vegetables and fruits, but the average American still ate 10.9 pounds of cabbage in 1994, almost all in fresh form. Per capita consumption of cabbage in 1970 was 11.1 pounds.

The U.S. market includes both the fresh cabbage used for cooking purposes, such as making cole slaw and egg rolls, and cabbage grown specifically for sauerkraut. Thirteen percent of the cabbage grown in 1994 became sauerkraut.

As with most vegetable yields, cabbage yields have increased over time. Average fresh-market cabbage yields nearly doubled from 1960 to 1994, jumping from 17,600 to 34,300 pounds per acre. Yields for processing cabbage jumped from 36,000 to 58,800 pounds per acre.

Cabbage is 7th among the top 20 vegetables, behind potatoes, iceberg lettuce, onions, tomatoes, watermelon, and muskmelon. Broccoli ranked 14th and cauliflower 18th, according to Ray Clark, executive director of the Leafy Greens Council, the Minnesota organization promoting consumption of cabbage and other green, leafy vegetables.

"The way we eat and the big emphasis on cruciferous vegetables as cancer fighters [have] increased the popularity," he said, adding that cabbage is high in fiber, calcium, iron, and other nutrients. "These are the properties that make it very nutritious," Clark said.

In 1994, the value of fresh-market cabbage totaled nearly \$237 million, while cabbage for sauerkraut was worth \$7.4 million. Cabbage production has also become more concentrated over the last 30 years, with fewer

states growing the vegetable. Its major varieties include savoy, danish, red, and Chinese cabbage.

In 1994, 16 states commercially produced fresh-market cabbage, with New York, Texas, California, Georgia, and Florida accounting for 75 percent of the crop. Thirty-four states shared production in 1960. Fewer states also are growing cabbage for sauerkraut. Wisconsin and New York now account for about 87 percent of it.

The United States ranked 7th in world cabbage production in 1993 at 4 percent. China grew the most—23 percent of the world total. Meanwhile, the United States exports more cabbage than it brings in. It shipped out nearly 83 million pounds of fresh cabbage in 1994, with 90 percent going to Canada. Canada also bought nearly all of the 8.7 million pounds of sauerkraut exported from the United States last year.

On the other hand, 74 percent of the 52 million pounds of fresh cabbage brought into the United States last year came from Canada, while more than 80 percent of the 6.5 million pounds of sauerkraut imports came from Poland.

Excerpted from The Sunday Journal, Kankakee, October 8, 1995.

Charleston Hot Sizzles to Market

The Charleston Hot pepper that U.S. Department of Agriculture scientists bred in that South Carolina city hit the news pages in early 1993. More than 28,000 seed requests later, the pepper is now being sold in at least eight seed catalogs and is the main ingredient in two new hot sauces.

The 2-year trek from laboratory to marketplace is something of a record for a vegetable variety released by USDA's Agricultural Research Service at Charleston. The new cayenne pepper sped to market faster than researchers ever imagined—overwhelming the agency's U.S. Vegetable Laboratory with seed requests from around the world.

"Charleston Hot was a record breaker from the beginning," says Philip Dukes, a retired plant pathologist at Charleston. "We've never had this kind of response to any vegetable we've released. Often it takes years for a new variety to catch on. Interest in Charleston Hot seemed to explode almost overnight."

Dukes and geneticist Richard L. Fery at the Charleston lab bred the Charleston Hot. Fery noted that Charleston Hot and its sister pepper, Carolina Cayenne, have become a hit in more ways than one. He says breeders worldwide are also using the peppers as sources of resistance against root knot nematodes.

At the dinner table, Charleston Hot peppers are the main ingredient in Holy City Heat, a sauce made by

Atlantis Coastal Foods, based in Charleston. The company produced a few thousand bottles of the sauce during 1994 and expects to boost production in 1995 because of the sauce's popularity, a spokesman says.

Holy City Heat is also being marketed for retail sale through the Mo-Hotta Mo-Betta catalog, which says of the sauce, "Beautifully packaged in an old-fashioned elixir bottle, it's sure to be the cure for what ails you!"

Also, the Three Amigos restaurant chain is marketing a hot sauce under the name Charleston Hell Hot Sauce, also made from Charleston Hot.

Dukes and Fery attribute the pepper's popularity to its spicy taste, high yields, resistance to southern root knot nematodes, and compact plant size for home gardens.

What other new peppers are in store from Charleston? Fery says he expects to release next year a new line of bell peppers that are resistant to root knot nematodes. "Genetic resistance is important because the fumigant methyl bromide, used to control these nematodes, is being phased out."

Fery and agency plant pathologist Judy Thies at Charleston have begun work to breed habañero peppers with root knot nematode resistance. Habañeros are the hottest cultivated peppers—several times hotter than cayenne—and are increasingly popular in the United States. But Fery says a new nematode-resistant habañero is probably at least several years away.

Dukes and Fery reiterate that the Charleston lab no longer fills requests for Charleston Hot seed. People interested in obtaining seed should contact seed companies directly.

Excerpted from Agricultural Research, USDA ARS, Washington, D.C., October 1995.

Consider the Pumpkin

Anyone who has driven the back roads in recent autumns knows that farm markets are loaded with pumpkins. This calls for a little research into the natural history of, and a mild tribute to, an attractive and serviceable fruit. Not surprisingly, the pumpkin was earning its keep long before pies and Halloween made it a seasonal symbol.

When *Cucurbita pepo* was first cultivated, it was for its seeds, which were a prized snack among the 6th-millennium B.C., cave dwellers of the Tamaulipas Mountains in Mexico.

Its earthy-smelling orange pulp was recommended to Europeans as a foodstuff when the first year's crops failed at Jamestown and Plymouth. In both places, Native Americans showed the colonists a new, strange food that could be dried in slices hung from the rafters, mixed with

cornmeal for bread, combined with milk and made into custard, or baked in hot ashes.

It is unlikely that the first Thanksgiving meal included pumpkin pie, which was invented later in imitation of the British meat pie. Until the advent of Pilgrim pumpkin, pie was a main course, never sweet. The colonial innovation was the first time it was served as dessert. The early concoctions were very big and were baked in rectangular dishes called coffins. Amelia Simmons published the first recipe in 1796; but by the late 1600s the colonists were already so dependent on the traditional dessert that one town in Connecticut postponed Thanksgiving until a late shipment of molasses arrived from the West Indies.

It was not until the 1840s, when people began arriving from Ireland, that the New World fruit met Old World pagan tradition, resulting in the grinning orange faces now guarding suburban stoops across the nation. The jack-o'-lantern is linked to a precursor of Halloween, the Druid Feast of Samhain. At that time, priests offered animal (and sometimes human) sacrifices and built bonfires (bone fires) on hilltops. Samhain, the Lord of the Dead, came to earth that night to collect the spirits of all who had died during the year. Demons and witches, celebrating the return of the season of darkness, were let loose upon the earth to trick and terrify mortals.

There were two ways to escape the tortures of the demons: fool them by dressing as one of them to escape their notice, or pacify them with sweet foods. So the options were to "trick or treat" these evil spirits.

The development of the jack-o'-lantern gets a little more circuitous. In Ireland a notoriously stingy drunkard named Jack was said to have tricked the Devil into climbing an apple tree, where he was trapped. Jack made the price of freedom a promise from the Devil never to take his soul.

Eventually Jack died, and was rejected from heaven because of his meanness and his fondness for drink. When he tried the other place, he was also rejected because of the Devil's old promise, but the Devil did give Jack a coal from the fire of Hell to light his journey from the netherworld. Jack placed the coal in a turnip he had been eating and began wandering the earth, homeless, waving his "jack-o'-lantern."

In times past, Irish children carved faces in Halloween lanterns made from potatoes and turnips. When they reached America, they discovered the natural superiority of the pumpkin as a receptacle for satanic fire.

Now on Halloween, the last great pagan holiday, the New World pumpkin grins through a night still redolent of Old World magic. It is impossible to imagine such effective ghoulish grimaces coming from a turnip.

Excerpted from The New York Times, New York, New York, October 13, 1994.

More Pumpkin Stuff

Let the kids razzle-dazzle their friends with these fun facts about the pumpkin:

- In George Washington's day, pumpkin was so popular that people ate it morning, noon, and night—in pumpkin fritters, pumpkin soup, and, of course, as pumpkin pie.

- The Great Pumpkin lives! Last year, Canadian farmer Herman Bax had his name listed in the record books for growing the world's largest pumpkin ever—a 990-pounder! Pumpkin experts expect to see a still grander pumpkin, breaking the once unimaginable 1,000-pound barrier, perhaps as early as next year.

- The next time someone snaps a picture, smile and say, "Pumpkin." Beta-carotene, an orange plant pigment which gives pumpkin its bright color, is converted by the body into vitamin A. Vitamin A not only makes teeth healthy and can help prevent a toothless-looking jack-o'-lantern grin; it also keeps skin smooth, vision clear, bones strong, and holds colds at bay.

- While pumpkin does make phenomenal pies, this versatile vegetable can be used to make a variety of other delicious dishes. For the best-tasting pumpkin, look for those that are relatively small, usually no more than 5 to 7 pounds. Save the large jack-o'-lantern types for decorating. (For the best taste and texture, choose a pumpkin that is a squash! But that is another story.)

- Pumpkins are the ultimate play food. Kids love to roll these basketball-size vegetables under the spigot to wash them. After parents cut a lid off the top at the stem end, kids delight in pulling out the slimy seeds and clinging strings from the pumpkin's interior.

- Bite-size pumpkin chunks taste great when they are steamed for 15 to 20 minutes, then sprinkled with lemon juice, ground ginger, or sesame seeds. Like potatoes and winter squash, pumpkin chunks can also be added to soups, casseroles, and hearty entrees like Pumpkin Pot Beef Stew (below). Baked and mashed pumpkin easily incorporates into cake, muffin, quick bread, and pancake batters, and makes a pie filling that may be far superior to the canned variety (depending on the quality of the pumpkin you start with).

- Do not throw away those pumpkin seeds. Instead, toast the seeds with a little salt or barbecue flavoring to make a protein-packed snack.

Some Final Recipes

Pumpkin Pot Beef Stew

- 1 tablespoon vegetable oil
- 1-1/2 pounds boneless lean beef chuck, trimmed of fat

- and cut into 1-inch chunks
- 1 medium-size onion, chopped
- 1 stalk celery, diced
- 2 cloves garlic, minced
- 1/2 teaspoon black pepper
- 2 (10-1/2 ounce) cans beef broth
- 1 (14-1/2 ounce) can whole tomatoes, undrained and chopped
- 2 bay leaves
- Flesh from 10- to 12-pound pumpkin, cut into 1-inch chunks—about 5 to 6 cups
- 1 sweet potato, peeled and diced
- 1 white potato, peeled and diced
- 2 teaspoons beef-flavor bouillon granules
- 1/2 teaspoon chili powder (optional)
- 1/4 teaspoon ground cinnamon
- 1/4 teaspoon ground cloves
- 1/4 cup water
- 3 tablespoons all-purpose flour

Heat vegetable oil in large soup pot. Add beef, onion, celery, garlic, and pepper. Cook, stirring occasionally, until meat is browned on all sides, about 8 to 10 minutes. Drain off excess fat. Add broth, tomatoes, and bay leaves. Bring mixture to a boil, then reduce heat, cover pot, and simmer for 1 hour, or until meat is tender. Stir in pumpkin, sweet potato, white potato, bouillon granules, chili powder (if desired), cinnamon, and cloves. Bring soup back to a boil, then reduce heat, cover, and simmer for 45 to 50 minutes, until vegetables are tender. Remove and discard bay leaves. In separate mixing bowl, whisk together water and flour, until flour has fully dissolved. Add flour mixture to beef. Cook, stirring constantly, until thickened, about 3 to 5 minutes. Ladle soup into either serving bowl or prepared pumpkin shell. If serving in pumpkin shell, use oven mitts to place filled pumpkin in 13x9x2-inch baking pan. Fill pan with 1/2-inch water and bake in 350°F oven for 15 minutes until pumpkin is warmed and soup is hot.

(Reprinted from *The Daily Journal, Kankakee, September 27, 1995.*)

Vegetable Chili

- 1 large eggplant, unpeeled, cut in 1-inch pieces
- 2 cups chopped onions
- 1 large sweet potato, peeled, halved, sliced
- 1 large red or green pepper, chopped
- 4 cloves garlic, minced
- 1/2 to 1 small jalapeño pepper, minced
- 1 tablespoon flour
- 2 tablespoons chili powder
- 1-1/2 teaspoons ground cumin
- 1 teaspoon oregano
- 1 teaspoon thyme
- 3 cups chopped tomatoes
- 1 can (19 ounces) garbanzo beans, rinsed and drained

1 can (15 ounces) black beans, rinsed and drained
1-1/2 cups vegetable or chicken broth

Sauté eggplant, onions, sweet potato, red or green pepper, garlic, and jalapeño in Dutch oven until tender, 8 to 10 minutes. Stir in flour and herbs; cook 1 to 2 minutes.

Add tomatoes, beans, and broth; heat to boiling. Reduce heat and simmer covered 20 minutes; season to taste with salt and pepper. (*Reprinted from The Daily Journal, Kankakee, October 11, 1995.*)

Cranberry Squash

1-1/2 pounds winter squash, unpeeled, cut in serving-size chunks or halved
1/2 cup fresh cranberries
1 small apple, chopped
1/4 cup chopped raisins
Juice and grated peel of 1 small orange
1-1/2 tablespoons honey
1 tablespoon melted butter (optional)
dash salt

If using small squash, such as acorn or butternut, you may halve them. For larger squash, arrange pieces in one layer in a baking dish. For small squash, mix all remaining ingredients together and pile into squash cavities. For pieces of squash, scatter cranberries, apples, and raisins over and around squash. Combine orange juice and peel, honey, butter, and salt; pour over squash.

Cover baking dish and bake at 375°F until squash is tender—25 to 45 minutes, depending on variety and size. (*Reprinted from The Daily Journal, Kankakee, November 8, 1995.*)

That's all, folks!



Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
at Urbana-Champaign
1301 West Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

AG. LIBRARY - SERIALS CLERK
226 MUMFORD HALL
1301 WEST GREGORY DRIVE
CAMPUS MAIL



Illinois Vegetable Farmer's Letter

Welcome to another spring that cannot seem to make up its mind! As planting season gets into full swing, you want to be aware of certain pieces of legislation, consumer attitudes, and reports that may affect your business in the future. Several relevant articles are included in this issue.

Some timely pest information updates also follow. These range from the downright hopeful to the absolutely bizarre. See what is new in insect adaptations and our responses to them.

International marketing of produce is becoming very active. Read some fairly good news for a change. Plant breeding may have finally cracked the garlic mystery. Produce is yet again identified as a preventer of disease.

Read the sometimes frustrating accounts of how the general public perceives agriculture, and try to balance your pessimism with the hopeful news on some pest control and marketing fronts. Try to devise strategies to live in harmony with the consuming public, however misguided their conclusions may seem to you. Consumers need producers, and producers need consumers. You have at least that much in common.

As always, be careful out there as long hours and anxiety take their toll through this busy planting season.

Food Groups Support Pesticide Reform Legislation

A broad coalition of food and produce groups is again supporting passage of pesticide reform legislation that is expected to be introduced by Representative Tom Bliley, R-Virginia, the new chairman of the powerful House Commerce Committee and its subcommittee on health.

With the Republicans now in power in the House and Senate, environmental groups, which oppose the Bliley legislation, are going directly to the food industry with a message and a warning—support for Bliley is “anti-consumer.” In a half-page advertisement in the January 16 issue of *The Packer*, some 14 environmental groups

claimed that the Bliley bill “will allow more pesticides in food, including cancer-causing pesticides, and [that] his bill ignores the warnings of the National Academy of Sciences that pesticide regulation must be tightened to protect kids from cancer and other diseases.”

The ad indicates the groups will step up grassroots pressure against food industry support for the Bliley bill. “Over the next few months we’ll be asking major food processors, wholesalers, and retailers to tell their customers whose side they’re on,” the ad states. Among the ad’s sponsors are the Sierra Club, Greenpeace, Natural Resources Defense Council, National Parent-Teacher Association, the Environmental Working Group, and Citizen Action. They claim to represent 15 million consumers.

The Bliley bill is less restrictive than the Waxman-Kennedy bill supported by environmentalists, but Bliley would speed up the removal of problem pesticides. It would also overturn the Delaney Clause, which calls for zero risk in the food supply. Bliley would also allow the Environmental Protection Agency greater flexibility in regulating pesticides but would not dictate a wholesale elimination of chemicals.

The Waxman-Kennedy bill sets far stronger restrictions on pesticides and eliminates any consideration of benefits, such as cheap and abundant produce supplies, when regulating pesticides. Waxman-Kennedy would build in more safeguards for children in regulating pesticides. “It’s basically a children’s protection bill,” said Richard Wiles of the Environmental Working Group. Wiles, whose name is in the ad, said that retailers and other food organizations need to “get off the fence” and let the public know how they stand on pesticide issues.

On the other side, the Food Chain Coalition, which represents 230 food and agricultural organizations, has again endorsed the Bliley legislation, which is expected to be introduced in the 104th Congress. The coalition, which includes the Produce Marketing Association, International Apple Institute, Farm Bureau, and U.S. Chamber of Commerce, has written to all members of the new Congress voicing its support for Bliley.

The coalition stresses that “the need for reform is pressing” and cites the 1992 Court of Appeals decision that upholds the Delaney Clause. EPA, under the court order, is expected to begin pulling many pesticides from the market.

In the last Congress, the Bliley bill, called the Food Quality Protection Act, got 225 co-sponsors in the House, which is a majority, but a vote was not taken. An



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

identical bill was introduced in the Senate by Senators Richard Lugar, R-Indiana, and David Pryor, D-Arkansas.

Excerpted from The Packer, Shawnee Mission, Kansas, January 16, 1995.

Food Industry Seeks Labeling Law Changes

Just months after the government trumpeted new food labels designed to end Americans' confusion over what constitutes a healthful diet, the food industry wants to change the rules.

The National Food Processors Association has just petitioned the government to allow more foods to make claims about their ability to prevent disease. The trade group wants to change the wording it has to use to describe a food's health benefits and the nutrient levels. "Our goal here is to make sure we have more accurate information going to consumers," said Juanita Duggan, vice president of the association.

If the Food and Drug Administration doesn't make the changes, the association—noting that dietary supplement makers just won some congressional relief from similar FDA rules for that industry—promised to take the issue to Congress next year. Consumer advocates said such changes would wreak havoc with consumers who are finally learning to understand—and trust—what they read on a package of meat or a microwave dinner.

The Food and Drug Administration agreed. "We're quite happy with the regs as they are," said FDA spokesman Don McLearn. "The feedback we've gotten is [that] the rules are working quite well; there's more understanding of the food label than there's ever been."

At issue are FDA regulations that went into effect last spring restricting how manufacturers describe their foods. Products must meet special criteria to be called "healthy," to say they are an "excellent source" of the calcium that fights osteoporosis or the fiber that fights cancer, or to say they are low in fat, cholesterol, and sodium.

Those criteria are too strict, the food processors say. For example, processors of whole milk cannot point out that it is high in bone-strengthening calcium because it also contains artery-clogging fat. Labels on low-fat and skim milks recommended for most adults, however, can play up the calcium benefit. The food processors say that whole milk should be allowed the calcium connection, too, as long as the label carries a disclaimer regarding the fat content. Fat is not an issue for some people, and they should know that calcium is in all milk, Duggan said.

Excerpted from The News-Gazette, Champaign-Urbana, October 26, 1994.

Herbicides and Drinking Water Contamination

A study linking grower use of herbicides to drinking water contamination drew heavy news coverage and agricultural chemical industry attempts to downplay the findings. "Why has the Environmental Working Group chosen to unnecessarily attempt to scare the public again?" said Jay Vroom, president of the American Crop Protection Association, which recently changed its name from the National Agricultural Chemicals Association. "First it was food; now it is water." He said the Safe Drinking Water Act requires the Environmental Protection Agency to "establish and enforce public drinking water standards for pesticides."

Most of the herbicides named in the study are used on major feed and grain crops such as wheat, corn, and soybeans. There was no mention of produce crops. EPA administrator Carol Browner said that "Americans should be concerned but not alarmed by the findings."

She noted Congress tried but failed to rewrite the Safe Drinking Water Act in its past session. The Environmental Working Group released a study, called "Tap Water Blues," indicating that nearly 14 million people in the Midwest, Louisiana, and the Chesapeake Bay region drink water "commonly contaminated with between two and four different herbicides."

"The drinking water in nearly every midwestern city south of Chicago is contaminated with agricultural weed killers," said Richard Wiles, vice president of the environmental group. He added that the herbicides are particularly high in water used in Kansas City, Missouri; Indianapolis, Indiana; Omaha, Nebraska; Columbus, Ohio; and Springfield, Illinois. Dozens of smaller towns and cities had high herbicide levels.

Although the people releasing the report said they did not want to spark a water scare, they urged the public to drink bottled water during periods of high herbicide use, May through August. The study received heavy newspaper and television coverage. A headline in the *Washington Post* said, "Farm herbicides foul tap water for 14 million." Five major herbicides were cited in the study, including atrazine, cyanazine, simazine, alachlor, and metolachlor.

The Environmental Working Group, which is opposed to most pesticide use in food, wants the herbicides eliminated or phased out and replaced by nonchemical weed controls.

Excerpted from The Packer, Shawnee Mission, Kansas, October 17, 1994.

Watermelon Fruit Blotch Research Approved

On November 11–12, 1994, directors of the National Watermelon Promotion Board approved an award of \$25,000 to fund research into watermelon fruit blotch, a devastating disease that caused some production losses last year.

At their annual meeting in Orlando, Florida, NWPB board members unanimously agreed to award \$25,000 to the Watermelon Fruit Blotch Committee, a national group representing watermelon growers, seed industry executives, transplant producers, and public researchers. The research award will be administered by the American Seed Research Foundation. The NWPB decision was made pending approval by the U.S. Department of Agriculture.

“We view funding watermelon fruit blotch research through the Watermelon Fruit Blotch Committee as an important way for the industry to come together as a whole to address this critical industry need,” said William Watson, NWPB executive director.

Additionally, Watson said that the leaders of the NWPB, a non-profit organization of watermelon producers and handlers, are very committed to pitching in to help resolve the problem. He noted that the National Watermelon Association and the Florida chapter of the National Watermelon Association recently have each elected to award \$10,000 to the Watermelon Fruit Blotch Research Committee.

“I think the additional funding would be a tremendous help in speeding up the progress we can make in detecting and controlling the disease,” said Donald L. Hopkins, University of Florida professor and chairman of the Watermelon Fruit Blotch Committee. “Without outside grant moneys, we’re limited in the amount of research we can do.”

Watermelon fruit blotch, first discovered in 1989 in Florida commercial fields, scars the melons and sours the meat. Some production losses in 12 states this year were attributed to the bacteria, although the majority of watermelon acreage was not affected.

Hopkins said the Watermelon Fruit Blotch Research Committee was established to judge and prioritize research proposals according to industry needs. The committee has agreed to fund research in seven areas, including developing methods to assure that seed lots are free of fruit blotch bacteria. Other research projects focus upon reducing the spread of fruit blotch in transplant houses and determining if fruit blotch spreads after harvest.

Excerpted from National Watermelon Promotion Board news release, November 29, 1994.

Rootworm Surviving Soybean Rotations

The northern corn rootworm apparently has adapted itself to the standard nonchemical way to combat it—planting soybeans for a year. Now, scientists investigating problems with the related western corn rootworm fear that it may have accomplished the same adaptation. If so, the rootworm will assure its continued status as the No. 1 agricultural pest in terms of the amount and cost of pesticide used to fight it.

Researchers from the University of Illinois and the Illinois Natural History Survey have found that the western corn rootworm is surviving one-year soybean rotations and that damage from those survivors has increased from the 6 to the 10 percent range in the last five years. After reports of problems around Piper City, researchers checked 100 fields in 10 counties. They found economic damage to fields in only three cases—all in Ford County.

However, rootworm survival after soybean rotation has been marked in Iroquois and Livingston counties as well. Kankakee County Corn Grower members Al Klepk and Rich Lottinville of St. Anne note that the rootworm carry-over is a problem, especially in heavier soils. Lottinville said, “We had some severe rootworm damage on soybean ground where we normally wouldn’t use insecticide, and even on corn-on-corn ground where we do use insecticide. Apparently, it is from some severe infestations of rootworm larvae.”

Klepk said the carry-over in soybeans “also is a problem around here, especially around Chebanse and west of here. We don’t see it so much in the sandy soils around St. Anne, but in the heavier ground. The soybean is not [supposed to be] a host plant for rootworm. “[The problem has] the guys at the U of I scratching their heads.”

University of Illinois entomologist Kevin Steffey thinks dry weather in recent years may have allowed the western rootworm to survive in soybean rotations. However, he told *The Pantagraph*: “I think there is little, if any, link to tillage. We received as many reports from conventional farmers as no-tillers.”

“The other, remote possibility is that the rootworm beetles are adapting to a corn/soybean rotation and are learning to feed on soybean plant roots. No other state has reported this problem, with the exception of a few western Indiana counties bordering Iroquois County.”

The University recommendation has been not to use insecticide on corn planted after soybeans. Evidence, so far, does not justify changing that recommendation, although the new development should be considered.

At the Natural History Survey, Eli Levine is doing work to determine if rootworm beetles are laying eggs in

soybean fields late in the summer. His work may account for the appearance of rootworm larvae in the corn the next year. Levine also will research possible adaptation through "extended diapause"—the strategy by northern corn rootworm to survive the soybean field through a two-year dormancy. The northern variety also has developed resistance to chlorinated hydrocarbons used in pesticides.

Dr. James L. Krysan, head of the national program for biocontrol at the USDA's Agricultural Research Service, says the rootworm "is still the champion when it comes to pesticide use in this country. There is more pesticide put down for corn rootworm than any other pest. The females lay their eggs and in the spring, they hatch, and the larvae feed on the roots of the corn next year. So if you plant corn every year in the same place, you have a terrible pest problem."

Excerpted from The Daily Journal, Kankakee, September 9, 1994.

Chinese Wasp Fighting Corn Pests

Researchers from Cornell University used a wasp imported from China to fight a major corn pest. The Cornell team has studied a variety of parasitic wasps no larger than specks of dust—weighing the insects' ability to help control the European corn borer in sweet corn fields.

"So far, the use of *Trichogramma ostrinae*, a species imported from China by some of our colleagues in Massachusetts, has provided the best results," said Tony Shelton, an entomologist at Cornell's Agricultural Experiment Station in Geneva, New York. These minuscule wasps prey on the eggs of the pesky borer, killing them before they hatch. Such assistance could be a financial boon for the sweet corn industry, allowing growers to reduce the use of pesticides.

The researchers are trying to establish the Chinese wasp in New York State, releasing 4 million of them over the past three years. If they succeed, sweet corn growers will have continuous free pest control. In the event the number of corn borers in a field exceeds acceptable limits, more wasps can be released instead of increasing pesticide use.

The research has been conducted with the aim of decreasing pesticide use through integrated pest management, which uses natural resources such as wasps in an effort to control pests with fewer chemicals. Shelton has also experimented with the use of Bt, an organic insecticide that kills borer larvae without harming other helpful insects, allowing producers to use it in conjunction with the wasps. "Industry-wide adoption of proven (pest management) programs has already reduced the number

of aerially applied insecticides in processed sweet corn fields by 30 to 70 percent," Shelton said.

Excerpted from The Daily Journal, Kankakee, August 17, 1994.

Pepto-Bismol Dye Deadly to Pests

A pink dye used to color Pepto-Bismol and lipstick kills Mediterranean fruit flies and shows early promise for eventually replacing the pesticide malathion in California's costly and controversial war against that crop-destroying pest.

Separate tests by two U.S. Department of Agriculture scientists show that medflies in Hawaii and Mexican fruit flies in Texas perish when they are exposed to light after feeding on low concentrations of dye mixed with bait. Apparently when the dye catches light energy from the sun, oxygen turns into a destructive form that wipes out cells in the flies' gastrointestinal tracts.

Because aerial spraying of malathion—used periodically to combat medfly infestations in southern California—has evoked a public uproar for more than a decade, discovery of a nontoxic and inexpensive alternative could be a major advance for farmers and agricultural officials.

In the trial, the dye mix, called SureDye, did not injure crops and has no known harmful effects on humans, wildlife, or other plants. USDA officials say the dye had already undergone the rigorous testing that was required by the Food and Drug Administration before its approval for use as a color additive in consumer products such as antacids and cosmetics.

Excerpted from The Daily Journal, Kankakee, December 16, 1994.

Related Genes Fight Crop Disease

Scientists have discovered a new family of genes that could eventually replace the poisonous chemicals on which farmers and gardeners rely to control crop-killing diseases. "It's a discovery that brings us up to a whole new level of understanding," said Brian Staskawicz of the University of California, Berkeley, who isolated one of the genes.

Staskawicz and a separate team of Harvard researchers led by Fred Ausubel each isolated the RPS2 gene from a member of the mustard family, *Arabidopsis thaliana*. This gene fights off a serious bacterial infection.

Simultaneously, Barbara Baker and colleagues at Berkeley and the U.S. Department of Agriculture isolated

the N gene from tobacco, the first gene ever cloned that defends a plant against a virus. The researchers predict that within three years they may know enough from these genes to start fighting plant diseases without the chemicals and crossbreeding on which farmers now rely.

Importantly, these genes—and a newly discovered fungus-fighting gene from flax called L6—are related. “That’s the really exciting part,” Staskawicz said. “We’ve basically discovered a new class of genes that can recognize a diverse group of pathogens.” All three genes are from unrelated plants and work on totally separate types of diseases. But when the researchers compared the sequences of proteins and amino acids that make a gene unique, they found startling similarities. In fact, some sequences were identical.

Such broad resistance within a single family of genes signals that the genes will be easy to transfer into other plants. That means scientists could one day, with just a little genetic engineering, protect any plant from bacterial, viral, and fungal infections in one fell swoop. “It could have a very big impact,” said Michael Deom, a plant pathologist at the University of Georgia. Now, it takes farm researchers decades to breed disease-resistant plants, and the technique only works with closely related species. The only other choice is to fight infections with chemicals.

Still, some researchers had feared that plant genes would be too specific to ever replace these techniques. They had succeeded in isolating just two genes, each of which protects only tomatoes against one disease. Then, this summer Australia’s Jeff Ellis unveiled L6 at a scientific meeting, and the other researchers coincidentally cloned RPS2 and N at the same time. Because of the timing and “simple curiosity,” Baker and Staskawicz compared their genes and then L6—and found the similarities in how the genes work.

Excited by the finding, they are already trying to transfer N and RPS2 into tomatoes. “In hindsight, it makes sense,” Baker said of the similarities.

Each of the plants defends itself against the gene-targeted diseases through a process called hypersensitivity, quickly killing surrounding cells so the infection cannot spread, she explained. That is the optimal kind of disease resistance, but one scientists do not yet understand, Deom said. “The idea is to learn how it works and see if you can introduce the system into other plants that do not normally show a response,” he said. “Now, hopefully, all this work will pay off.”

Excerpted from The Daily Journal, Kankakee, September 23, 1994.

Vegetable Sales Expanding

The vegetable business keeps rolling along on the strength of shifts in American eating habits. Sales of both fresh and processed vegetables are expanding, although at different paces. Purdue’s Glenn Sullivan says the overall outlook for vegetable producers and processors is reasonably good.

The fresh vegetable industry continues to provide excellent growth for producers who are willing to diversify and commit to meeting the marketing services demands of domestic consumers and exporters. Retail sales of fresh vegetables reached \$37 billion in 1993. Food service, exports, and other sales added another \$25.7 billion. Forecasts for 1994 indicate another 3.5 percent increase to \$64.9 billion. Recent independent studies predict that total sales could reach \$75 billion by 1998. These strong growth trends continue to be driven by the diet upgrading of health-conscious consumers domestically, and by rising income in foreign countries bringing expectations of higher quality.

In vegetable processing, production continues to expand, but on a more selective basis. Total production for the nine major processing vegetable crops increased only 1 percent in 1993, reaching 14.4 million tons. Preliminary numbers for 1994 indicate that production in the four major midwestern processing vegetable crops—tomatoes, sweet corn, snap beans, and green peas—will increase 24 percent over 1993.

Most of these trends should continue through 1995. The factors driving consumption of fresh vegetables seem particularly unlikely to change. Increased demand for a diverse product mix presents some additional opportunities for talented growers.

Eastern Corn Belt producers should carefully evaluate opportunities for diversification and/or expansion in the vegetable industry. Fresh vegetables represent the greatest opportunity but require a serious commitment—you must develop fully integrated programs to maintain supplies and market the product. Vegetables that are grown without regard to retail demands for quality, timeliness, consistency, packaging, and supply consolidation will likely end up on the terminal wholesale markets at prices below the cost of production. Producers who make the effort to carefully plan their vegetable production will find continuing opportunities for growth and profits, particularly in the fresh vegetable sector.

Excerpted from The Prairie Farmer, Decatur, December 1994.

Potato Exports Hit Record High

U.S. exports of fresh and processed potatoes reached a record high of \$485 million last year, according to the U.S. Department of Agriculture. Potato exports have nearly doubled over the past five years, climbing from \$250 million to the current level.

Frozen processed potato products accounted for the largest portion of the exports, at a value of \$190 million. Potato chip exports followed close behind at \$150 million, five times higher than five years earlier. USDA predicts that frozen and processed potato products will continue to drive the growth in exports in the near future.

The department expects fresh potato exports to remain somewhat limited due to strict regulations in many countries, although recent entry into the Taiwanese market sets a precedent for future expansion.

Former acting Agriculture Secretary Richard Rominger praised the potato industry for its accomplishment. "The steady growth in U.S. potato exports has contributed to the overall expansion of U.S. agricultural exports, which are expected to reach a record \$45 billion in 1995," Rominger said. Japan was the major buyer in 1994, importing 140,000 metric tons of frozen potato products worth more than \$100 million.

Excerpted from The News-Gazette, Champaign-Urbana, February 1, 1995.

Growing Garlic from True Seed

Used as a spice, an herb, and a vegetable, garlic is one of the oldest known cultivated crops in history. A member of the Lily family, *Allium sativum* is normally sexually sterile. It produces a pungent bulb that resembles an onion in size, but its leaves have solid, flat blades rather than hollow, tubular ones.

"Garlic plants that produce flowers are rare in most U.S. varieties. By cutting the flower stalk from the underground bulb, we were able to stimulate seed production in certain garlic strains," said Philipp W. Simon, plant geneticist at the USDA ARS Vegetable Crops Research Laboratory in Madison, Wisconsin.

He used 200 clones, including standard U.S. varieties of *A. sativum* and a wild ancestor, *A. longicuspis*, from the ARS Plant Germplasm Introduction and Testing Research Unit in Pullman, Washington. Sixty percent of these clones produced flowers—from germplasm originating in Brazil, Germany, Poland, and the former Soviet Union.

Botanical seed derived from the garlic flowers—true seed—resembles little, black onion seeds. "True seed shouldn't be confused with seed garlic—a term that refers

to cloves or bulbs typically used to plant a garlic crop," said Simon.

In California, the two major garlic types that produce large cloves and high yields are known as early- and late-maturing varieties. One key trait growers would like to alter is the time it takes for garlics to mature. In California, the growing season is about 10 months long, beginning in the fall, with planting from late September through November.

California growers produce about 250 million pounds of garlic on 21,000 acres. About 50 million pounds are sold on the fresh market, and 200 million pounds are dehydrated for use as flakes, salt, and in packaged foods, according to a spokesperson for the Christopher Ranch near Gilroy, California.

The capacity to develop garlic from true seed is an important research tool for increasing genetic variation of the crop. Once tapped, this variability could lead to garlics of different types, higher yields, and disease resistance. According to Simon, "One ideal scenario would be to develop an earlier maturing variety."

He said that combining genetic traits of different garlic plants may someday make it possible to produce garlics with sweeter and less pungent flavors—an idea that many garlic lovers might relish.

Excerpted from Agricultural Research Service, Washington, D.C., February 1995.

Vegetables Again Linked to Disease Protection

Two new studies offer tantalizing evidence that chemicals in green and yellow vegetables may protect against heart disease and the most common cause of blindness in the elderly. Much more research will be needed to determine which of the antioxidant chemicals may be protective, and in what quantities, over what periods of time, and in what types of people.

The compounds, called carotenoids, are the colorful pigments that make squash yellow and spinach green. Beta carotene is the best-known carotenoid, but it accounts for only about 25 percent of the carotenoids that the blood absorbs from food, and others are just beginning to be explored, researchers said.

In one new study, of 1,899 men with high blood cholesterol, those with high levels of carotenoids had 36 percent fewer heart attacks and deaths over 13 years than men with low levels of carotenoids in their blood. "When we looked at men who never smoked, the protective effect was much greater," wrote Dr. Dexter Morris in a fall issue of the *Journal of the American Medical Association*.

Nonsmokers with the highest blood levels of carotenoids had 70 percent fewer heart attacks than nonsmokers with the lowest levels, said researchers led by Dr. Morris of the University of North Carolina, Chapel Hill.

In the other study, Harvard researchers compared 356 people who had developed a visual disorder called age-related macular degeneration (AMD) with 500 similar people who were free of the condition. People who consumed the most dark green, leafy vegetables were 43 percent less likely to have developed AMD than people who had consumed the least, researchers said.

Those findings were also reported in the *Journal of the American Medical Association* and were being presented at the AMA's Science Reporters Conference in Seattle. "Increasing the consumption of foods rich in certain carotenoids, in particular dark green, leafy vegetables, may decrease the risk of developing advanced or exudative AMD, the most visually disabling form of macular degeneration among older people," said researchers led by Dr. Johanna M. Seddon of the Massachusetts Eye and Ear Infirmary and Harvard Medical School.

AMD causes vision loss in an estimated 13.1 million Americans and accounts for up to a third of the 900,000 U.S. cases of blindness, according to Prevent Blindness America, formerly the National Society to Prevent Blindness. Exudative AMD is a sub-type of the disease, in which tiny blood vessels grow under an area of the retina, causing scarring and hemorrhaging that block vision.

Researchers emphasized that the eye study did not establish cause and effect and called for more research, but they said it makes sense to encourage Americans to eat more dark green, leafy vegetables.

Two other researchers, who did not participate in either study, cautioned in an accompanying editorial that "not all antioxidants are created equal." Big differences in the structure and properties of antioxidants are likely to influence their ability to prevent disease, the editorial said.

It noted that the scientific community has had its ups and downs trying to show the benefits of beta carotene, which several studies suggested could protect against cancer and heart disease before two large studies suggested just the opposite. "Further exploration of specific carotenoids and other nutrients . . . should be a high priority for research," said the editorial by Drs. Susan E. Hankinson and Meir J. Stampfer of Harvard Medical School and Harvard School of Public Health.

Excerpted from The Daily Journal, Kankakee, November 9, 1994.

Recipes for Your Customers

Cream of Horseradish and Vegetable Soup

1/2 cup EACH diced celery, onions, and ham
1/4 cup diced carrots
4 cups chicken stock
1 tablespoon vegetable oil
1-1/2 tablespoons garlic (4-5 large cloves), minced
1-1/2 teaspoons dried thyme
2 large potatoes, peeled and diced
1 cup half & half
1/2 cup prepared horseradish

In a large stockpot, sauté vegetables and ham until vegetables are tender. Add garlic, seasoning, stock, and potatoes. Simmer until potatoes are tender.

Strain vegetables, saving broth. Puree vegetables in food processor until smooth. Add puree back to broth and add horseradish. Season with salt and pepper. Add half & half. Bring soup to boil and serve. (*Reprinted from The Daily Journal, Kankakee, December 7, 1994.*)

Garlic Bean Soup

2 cups vegetable or chicken broth
8 very large garlic cloves, peeled
1 medium onion, coarsely chopped
4 cups cooked white beans, or 2 19-ounce cans white kidney or cannellini beans, drained

Put the broth, garlic, and onion in a large bowl; cover. Microwave for 20 minutes on high, or until vegetables are soft. Transfer to a blender or food processor, add half the beans and puree. Return soup to bowl, add remaining beans and microwave 5 minutes, or until beans are heated through. Serves 6.

Per serving: 195 calories, 13.9g protein, 33.9g carbohydrates, 8g fiber, 0.9g fat (0.25g saturated), and 267mg sodium. (*Reprinted from USA Weekend, March 31-April 2, 1995.*)

Stuffed Baked Onions

4 large-diameter onions
1/2 pound loose sausage
1/2 cup Italian flavored bread crumbs
1/4 cup chopped celery root
1/4 cup chopped red sweet pepper
1/4 cup chopped celery
1 tablespoon minced garlic
2 tablespoons chopped parsley
2 cups loosely chopped chard leaves
2 tablespoons olive oil
2 tablespoons milk

1 cup beef stock
1/2 cup dry white wine

Slice the tops off your onions and slice the bottoms so the roots are removed and they can sit upright. (Let the skins remain on for the eater to peel.) Remove the cone-shaped cores from each of the onions and chop up the cores. Brown the sausage and set it aside. Pour the oil in a pan, heat it up, then add a cup of the chopped onion and sauté until the onion is clear. Add the garlic, celery root, pepper, and celery. Cover and cook on medium-low heat for eight minutes. Uncover, add the chard and parsley, raise the heat and cook just a minute or two until the liquid is almost gone. Add the sausage, bread crumbs and milk; stir, then add salt and pepper to taste. Stuff the cored onions with this mixture and set them in a baking dish.

Add the stock and wine to the bottom of the dish and cover with a tent of foil. Bake in a 425°F oven for 25 minutes, remove the foil, then bake uncovered for another 25 minutes. (If the liquid looks about to evaporate entirely, add a little more stock.) Remove the onions to a serving platter, then reduce any liquid in the baking dish and pour into the centers of the onions. Serves four.
(Reprinted from Organic Gardening, April 1995.)

Charles E. Voigt

Charles E. Voigt
Extension Specialist
Vegetable Crops

Cooperative Extension Service
United States Department of Agriculture
at Urbana-Champaign
1301 West Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

AG. LIBRARY - SERIALS CLERK
226 MUMFORD HALL
1301 WEST GREGORY DRIVE
CAMPUS MAIL



Illinois Vegetable Farmer's Letter

Is summer almost over already? The days are suddenly getting shorter. Once again we have seen that the bizarre is now the norm, as far as local weather goes. After the mild winter, it was cold and wet, then hot and dry, then hot and wet. Who knows what's next? It makes me pine for the golden days of autumn.

In some parts of the state, one farm may be doing pretty well, while another down the road a mile is in terrible shape. This has been the summer of the locally severe thunderstorm. I hope that all you faithful readers have managed to weather the uncertainty.

This is another year that makes irrigation potential a necessary investment. I see more and more

center pivots as I ride around Illinois on my travels. From traditional irrigation areas in Mason and Kankakee counties to almost anywhere lately, these big guns control the local rainfall. Seed corn companies all but demand them since the awful 1988 season.

With plenty of degree days in sight, abundant moisture (at least as I write this), and a considerable bit of season still to be lived, many crops may still be quite productive. The fresh sweet corn I have had so far has been stupendous in flavor, if a bit short on appearance. Fall vegetables should get a good start with fairly general rains recently. Hopefully, things are even better wherever you are reading this newsletter.

New Legislation May Relax Delaney Clause

"This food safety bill will pass" is the optimistic forecast of John Aguirre, vice president of government affairs for the United Fresh Fruit and Vegetable Association. Aguirre was commenting on the introduction May 2 in the House of Representatives of HR 1627, the food safety reform legislation that repeals the Delaney zero-

risk food safety clause, allows the Environmental Protection Agency to quickly remove problem pesticides, takes special consideration of children's diets when assessing pesticide risk, and makes it easier to keep relatively safe minor-use pesticides on the market for fruit and vegetable crops. "This time we've got the right bill and the right Congress," Aguirre said. He pointed out that this legislation has been introduced four times in eight years and gotten bogged down in Democrat-controlled Congresses.

The current bill is sponsored by Representative Pat Roberts, R-Kansas, chairman of the House Agriculture Committee, and Representative Tom Bliley, R-Virginia, chairman of the House Commerce Committee. "Our Delaney reform proposal directs EPA to determine what is safe—using the best available science—and then regulate accordingly," Roberts said.

The Delaney Clause says that any pesticide found to cause cancer in test animals must be banned from the food supply even if residues are so tiny they can barely be measured. The courts have upheld the rule. Without a change in the clause, dozens of pesticides used to produce fruits and vegetables are at risk of being banned. "Food safety is long overdue for an overhaul," Bliley said. "Our goal is to protect food safety while taking advantage of the advances in modern science since the Delaney Clause was enacted in 1958."

In the past, the legislation has been blocked by the Democrat-controlled House Commerce Committee and its health subcommittee, chaired by Representative Henry Waxman, D-California. With Republicans now in control, Waxman will no longer control the votes to block the legislation. Congressional staffers say they hope to move quickly, with hearings to take place in May and a possible floor vote by early summer.

Representative E. Kika de la Garza, D-Texas, ranking Democrat on the House Agriculture Committee, said the bill would help the United States "maintain our world leadership in safe, affordable food. Prudent, regulated use of pesticides is a valuable production tool, which benefits both producers and consumers of agricultural products."

The American Farm Bureau Federation, the nation's largest farm organization, has endorsed the bill.

Excerpted from The Packer, Shawnee Mission, Kansas, May 8, 1995.



Cooperative Extension Service
University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work

State • County • Local Groups • U.S. Department of Agriculture Cooperating
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

Public Fears More Than Cancer from Pesticide Use

"Public Perceptions of Agrichemicals," a January report by the Council for Agricultural Science and Technology (CAST) finds public concern with a range of health effects from agrichemical residues on food beyond the cancer risks. The report, which reviewed surveys on public perception of pesticide and agricultural drug use, found that concern about agrichemicals is not limited to food safety but extends to environment and farmworker protection.

Some respondents said they were concerned about allergies and nervous system disorders, important considerations for risk communicators, who, according to the report, "need to address a wider range of concerns than just the potential carcinogenicity of agrichemicals or just the risks from residues in foods."

On the other hand, Michigan State University's Eileen van Ravenswaay, author of the report, said the public perception of agrichemical use is not unified: Approximately one-fourth perceive a great chance of harm from pesticide residues in foods, while the same percentage perceives very little to no chance. The differences, said the report, are as yet unexplained.

Public perception is that effective alternatives to pesticides are available to battle pests. Since about half of the public does not realize that these alternatives are more expensive, they do not see the benefit of pesticide use.

An emerging theme in risk perception is public trust in government and industry. Research shows that the majority of the public does not trust government to enforce safety standards, or farmers to guarantee that the foods they sell are safe.

The Washington, D.C.-based group said that the conclusions in the report were based on a relatively small number of studies, since there has been little research on public perception of agrichemicals. CAST called for more research to develop valid and reliable theories, methods, and conclusions about public perceptions of agrichemicals and other agricultural technologies.

Excerpted from Growing Trends, Illinois Nurserymen's Association, Springfield, July 1995.

Approval Expected for Pesticide-Producing Plants

Corn, cotton, and potatoes that have been genetically modified to produce their own pesticides are moving closer to the marketplace. In a decision announced in

April, the Environmental Protection Agency allowed developers of the crops to plant them in order to build up commercial quantities of seed. The next step is to allow public sale and use. The agency is expected to give such approval soon to a potato that can kill the Colorado potato beetle, a common pest.

For all three crops, scientists have transferred genetic information from the *Bacillus thuringiensis*, or *B.t.*, bacterium to the plants. *B.t.* bacteria naturally produce an insecticide. Organic farmers and others who want to rely less on synthetic pesticides already apply the bacteria to plant leaves. "The agency believes that plant pesticides can offer an opportunity to reduce the use of conventional pesticides and generally result in less risk to public health and the environment," the EPA said in a statement.

Monsanto Company of St. Louis developed the potato and cotton seeds. The corn seeds were developed jointly by Ciba Geigy Corporation of Greensboro, North Carolina, and Mycogen Plant Sciences of San Diego, California. The cotton was engineered to resist cotton bollworm, tobacco budworm, and pink bollworm. The corn was engineered to resist the European corn borer and other moth-like insects.

The registrations will allow production of seed potatoes on 8,186 acres in Colorado, Idaho, Maine, Michigan, Minnesota, Montana, Nebraska, New York, North Dakota, Oregon, Washington, and Wisconsin; cotton on 36,850 acres in Texas, California, Puerto Rico, Arizona, Arkansas, Mississippi, and South Carolina; and corn on 9,725 acres in Florida, Hawaii, Iowa, Illinois, Texas, California, Nebraska, Wisconsin, and Puerto Rico.

The Union of Concerned Scientists, which is critical of the government's biotechnology policy, said that the agency is rushing its decision "in deference to industry requests." The group says the broader use of the naturally occurring pesticides will encourage the development of insects that can resist them. "The greater harm will be to organic farmers who will lose a very valuable tool once the *B.t.*-crops render the natural spray ineffective," said Margaret Mellon, a scientist and lawyer with the group.

Monsanto argues that its process will encourage the more effective use of *B.t.*, because insects will get a more consistently strong dose throughout the plant. As with people, resistance can develop when too little medicine is given for too short a time. Monsanto spokeswoman Lisa Watson said the company has other strategies that include mating the insects with those not exposed to *B.t.* and developing backup insecticidal proteins.

Excerpted from The Daily Journal, Kankakee, April 6, 1995.

Ozone as Chlorine Alternative

In an attempt to anticipate the Environmental Protection Agency's next move, the food processing industry is looking for alternatives to chlorine as a sanitizer for the water used to process fresh produce. One possible alternative being examined is ozone, a gas formed naturally in the upper atmosphere or generated commercially by an electric discharge in oxygen or air.

Charles Barmore, manager of laboratory applications for the Cryovac division of W.R. Grace and Company, a Duncan, South Carolina, manufacturer of plastic packaging for food and other items, said ozone-treated water has been shown in experiments to have a greater bactericidal effect than chlorine sanitizers. "It reacts quickly with organic material, killing the bacteria and producing a by-product containing oxygen instead of large amounts of chlorine," Barmore said.

An added benefit is the cost savings involved in using ozone, according to industry observers. The savings are realized because processors would have only to make a one-time investment into the ozone-producing equipment rather than to continually buy chlorine, according to Edith Garrett, president of the International Fresh-cut Produce Association, Alexandria, Virginia.

EPA regulations have no direct effect on the fresh-cut industry's product or processes, but some industry observers think that if the EPA begins to examine discharge water containing significant amounts of chlorine from processing plants, possible regulatory action could affect the industry's production processes.

"We were spurred to look at some alternatives to chlorine by environmental groups who were advocating cutting down on the use of chemicals," Garrett said. While it does not appear the Clinton administration will take any action on the matter, the industry will continue to search for other sanitization methods.

Research into the use of ozone by the food processing industry is already under way. Dole Food Company of Los Angeles recently signed a joint research and development agreement with Cyclopss Corporation, a Salt Lake City developer of technologies using ozone, to design a system which uses ozone in fresh produce processing.

Under the agreement, Dole and Cyclopss will design a test system to be built and installed by Cyclopss at the Dole research facility in San Jose, California. The test system will be used to document ozone's effectiveness in cleaning and sanitizing water used in fresh produce processing facilities.

John Ward, chief executive officer of Cyclopss, said the company began four years ago by developing an ozone system for sterilizing medical equipment for hospitals and has since become the nation's leading marketer of ozone washing systems for large commercial

laundries. Ward said he is hopeful that research into developing a system using ozone in food processing will begin immediately.

However, industry observers say that ozone will not totally eliminate the need for chlorine. The chemical would still be used for cleaning equipment. Also, ozone has some drawbacks of its own. "It's still a gas that can become volatile and exist in the air," Garrett said. Regulations on how much ozone humans can be exposed to have been established by the Occupational Health and Safety Administration (OHSA). "Ozone is a very powerful oxidizing agent that can cause some health concerns at a low level," Barmore said. "It would probably have to pass both EPA and FDA regulations before it could be used in direct contact with food in food processing."

The Food and Drug Administration has approved only the use of ozone for the treatment of bottled drinking water in poultry plants. Yet, in light of the EPA's current stance on chlorine, which includes a possible ban in some states, food processors must at least move toward reducing the use of chlorine. Other alternatives being considered by the fresh processing industry include chlorine substitutes, chlorine dioxides, and ultraviolet light (radiation). Research on chlorine substitutes and ultraviolet light have shown that neither one is as effective on bacteria as chlorine, Barmore said.

Meanwhile, the FDA is already reviewing a petition to expand the use of chlorine dioxide for fresh-cut produce. Although the compound would help reduce the amount of chlorine used by food processors, the disadvantage is that chlorine is still its base.

Excerpted from The Packer, Shawnee Mission, Kansas, July 17, 1995.

Employers of Illegal Aliens Face Crackdown

Tough new immigration bills now moving through Congress would crack down hard on growers, packers, restaurants, retailers, and other employers who knowingly or unknowingly employ illegal aliens. Congress and the Clinton administration seem poised to rewrite the immigration law to stifle employment of illegals, cut off illegal border crossings, and seize the property and assets of employers who hire illegal aliens. "Employer sanctions against hiring illegal aliens have not worked," said Monte Lake, a labor expert who works on labor issues for produce industry groups. "There's been a flood of fraudulent documents. There's been no integrity in the system."

But Lake is worried that as Congress approves a crackdown on employers and tightens the borders,

producers, packers, and others will see their labor supply dry up. A coalition of agricultural groups, led by the National Council of Agricultural Employers, wants Congress to add a new "guest worker" program for agriculture so that temporary foreign workers could come into the United States to pick fruits and vegetables and work in packing houses. "There's a train wreck coming," Lake said. "Business is just now waking up to what is happening."

The national council's Sharon Hughes said employers are already "walking a tightrope" when it comes to hiring. They must not hire illegal aliens, but they cannot "discriminate" in hiring by telling prospective workers which identity documents they must show. "The government wants to be able to seize an employer's assets, just [as] they do now with drug dealers," she said regarding the punishment for violators of the proposed bills.

The bills moving through Congress, with White House support, would pour \$1 billion into immigration enforcement, both at the border and in the workplace. The Department of Labor would be given broad police powers, and employer penalties for hiring illegals would increase substantially. Fines would more than double and triple. In addition, the Immigration and Naturalization Service could enter farm properties and packing facilities without a search warrant, which it now must have. The Senate bill, S-269, sponsored by Senator Alan Simpson, R-Wyoming, would establish a counterfeit-proof system of identification and verification for new workers to make sure they are legally able to be employed.

Hughes, Lake, and other observers who track the labor supply in agriculture are worried that the crackdown will lead to a labor shortage in fruits, vegetables, and other industries. The Seasonal Agricultural Worker Program contained in the 1986 immigration reform law has run out. A small temporary worker program, H-2A, has been plagued with problems.

Produce and farm groups want a new program that would allow foreign workers to come in temporarily to harvest fruits and vegetables. The workers would then have to leave the country. "We don't have a labor shortage now," Lake said. "We want to head off a crisis."

According to Jim Holt, a labor economist who specializes in fruit and vegetable labor issues, "Effective immigration control will significantly reduce the supply of labor to U.S. agriculture, and particularly impact the labor-intensive fruit, vegetable, and horticultural sector." Holt said that in fruit and vegetable production, labor costs account for 35 to 45 percent of overall costs, compared to 11 percent for all farms. Removal of alien workers from the United States will result in a reduction in U.S. fruit and vegetable production, and cause "a shift in world market share to producers outside the U.S." Lake said that critics of a temporary worker program

claim that if agricultural employers paid more, they could get domestic workers. He believes this is a false notion, and that U.S. growers cannot compete against foreign growers if the price of labor is bid up too high. He sees a guest worker program as a safety valve for the U.S. produce industry.

Lake believes immigration reform legislation will pass this year. The best hope now, he said, will be to get an amendment added to create the guest worker program. Senator Simpson has indicated he may conduct hearings on the agricultural labor situation.

Excerpted from The Packer, Shawnee Mission, Kansas, July 24, 1995.

Standards for Melon Seeds Developed

The California Crop Improvement Association has developed hybrid watermelon and amended open-pollinated melon certified seed standards to include field inspections and melon fruit blotch. Watermelon fruit blotch can be seed-borne and has severely damaged commercial fields, particularly in the Midwest and Southeast. The best control of this disease is the use of disease-free seeds because foliar chemical sprays have shown limited effectiveness, according to a news release.

Fields will be inspected at least twice, at the seedling and mature melon stages. Any seed fields found to have the disease will be rejected, and any seed testing positive for the disease also will be rejected.

Excerpted from The Packer, Shawnee Mission, Kansas, July 31, 1995.

Fruit and Veggies Trim Stroke Risk

Men, befriend those fruits and value those veggies. Eating lots of them may lower the risk of having a stroke. A 20-year study found that middle-aged men who ate a lot of fruits and vegetables were significantly less likely to suffer strokes than other men.

"It was a bit surprising to us how strong [the link] was," said the lead author, Dr. Matthew W. Gillman, assistant professor of ambulatory care and prevention at Harvard Medical School and Harvard Community Health Plan. "For every increase of three servings of fruits and vegetables per day, there was approximately a 20 percent decrease in the risk of stroke," he said in a telephone interview Monday from Boston.

The findings are published in a May issue of the *Journal of the American Medical Association*. The results

are similar to findings reported two years ago among women. Those who ate lots of spinach, carrots, and other vegetables and fruits rich in antioxidant nutrients had a 54 percent lower risk of stroke than other women. Stroke is the third leading cause of U.S. deaths, killing about 150,000 of the 500,000 people it strikes a year.

Besides protecting against stroke, eating a lot of fruit and vegetables has been linked to lower rates of cancer, although researchers are not sure if the connection is direct. Fruits and vegetables also contribute to a high-fiber, low-fat diet, which is strongly associated with heart health.

The new study involved 832 men—ages 45 to 65—who were tracked in the Framingham (Massachusetts) Heart Study for two decades. Over that time, 73 men suffered strokes and 24 others suffered transient ischemic attacks, or mini-strokes. The researchers calculated differences in stroke risk while accounting for other factors that might have affected the results—differences in blood pressure, cholesterol, smoking habits, alcohol consumption, and body fat.

The study did not explore how fruits and vegetables might be protective, but several possibilities have been suggested, including the fact that such foods are rich in antioxidant nutrients, Gillman said. Antioxidants such as vitamin C and beta carotene help prevent oxidation of “bad” cholesterol. When bad cholesterol combines with oxygen, it can lodge in arteries and restrict blood flow, causing a heart attack or stroke. Fruits and vegetables also contain potassium, which has been linked to blood-pressure control.

Another nutrient with suspected stroke-fighting potential is folate, or folic acid. Low folate levels are associated with high blood concentrations of an amino acid called homocysteine that contributes to blocked arteries.

Dr. Lewis Kuller, chairman of epidemiology at the University of Pittsburgh School of Public Health, was skeptical of the new research as well as the study among women that found similar results. “This paper doesn’t add much to what really is an unproven hypothesis,” Kuller said Tuesday. Both studies depended on the participants’ memory.

Excerpted from The Daily Journal, Kankakee, April 12, 1995.

The Power in Pumpkin Pie

Thanks to beta carotene, those orange vegetables gracing your table may help cut cholesterol and fight cancer and other diseases.

Cancer: Eating beta carotene may help save you from certain cancers, especially those tied to smoking. Researchers consistently report that a daily serving of carrots or other foods rich in beta carotene slashes the risk of lung cancer in half, even among former heavy smokers. Note: Preliminary results of a Finnish study say longtime heavy smokers taking high doses of beta carotene supplement have *more* lung cancer than heavy smokers taking placebos. Best bet: Stop smoking, and keep getting your beta carotene. Foods have other disease-fighting substances, so do not try to get by with a pill.

Heart Attack: Keeping blood levels of beta carotene up helps keep heart disease down, much evidence shows. A recent Harvard University study showed that men who took a daily beta carotene pill (25 mg, equal to four medium carrots) cut their risk of heart attack in half. Further, Scottish investigators found that eating 2 1/2 carrots a day reduced men’s cholesterol about 10 percent.

Stroke: Women who ate a carrot at least five times a week had only one-third the risk of stroke as those who ate a carrot once a month or less frequently, according to another Harvard study. Other research finds that stroke victims who have above-average blood levels of beta carotene are more apt to survive, to have less neurological damage, and to recover.

Cataracts: Spinach is the food most likely to prevent cataracts (a clouding of the lens of the eye) in elderly women, according to a recent British report. The probable reason: antioxidants, including beta carotene. Tufts University research finds that eating too few carotene-rich fruits and vegetables—under 1 1/2 servings a day—boosts age-related cataract odds 600 percent.

For the Most Benefit

In the Grocery: Pick orange vegetables that are the deepest orange in color. Pick leafy green vegetables that are the deepest green. Carrots, pumpkin, and spinach pack the most beta carotene per calorie. Per ounce, dried apricots have twice as much as any other food. You can get a quick beta carotene injection from carrot juice: 1 cup has 24 mg. Substitute raw spinach for iceberg lettuce, sweet potatoes for white potatoes. Note: In the United States, “yam” and “sweet potato” mean the same thing. True yams, a totally different genus and species, grow (up to 100 pounds) in Africa and Asia.

In the Kitchen: Eat beta carotene foods raw or cooked. Surprisingly, light cooking releases beta carotene so the body can better absorb it. Canning, freezing, and even boiling spinach and kale for an hour did not destroy beta carotene, tests by Frederick Khachik of the U.S. Department of Agriculture found. (Heavy cooking can destroy other nutrients, however.) It is insignificant whether or not carrots are peeled, and whether sweet potatoes are baked or boiled.

In a Restaurant: Load up on raw carrots at the salad bar, and go easy on the dressing. Order carrots, squash, and spinach without butter or cream sauces. Dried fruit compotes with apricots and peaches are beta carotene powerhouses.

Excerpted from USA Weekend, November 4–6, 1994.

Recipes for Your Customers

Corn Chowder

1 pound bratwurst, cut into 1/4-inch thick slices
2 10-ounce packages frozen whole-kernel corn
1 cup cubed, peeled potato
1 cup chopped onion
2/3 cup water
1 tablespoon instant chicken bouillon granules
1/2 teaspoon pepper
3-1/2 cups milk
2 tablespoons margarine or butter
1/4 cup all-purpose flour
Sliced green onion (optional)

In a Dutch oven, combine the bratwurst, corn, potato, onion, water, bouillon, and pepper. Bring to boiling; reduce heat. Cover and simmer about 10 minutes or until corn and potatoes are just tender, stirring occasionally. Stir in 3 cups of the milk and the margarine. Combine the remaining milk and the flour. Stir milk-flour mixture into the corn mixture. Cook and stir over medium heat till thickened and bubbly. Cook and stir 1 minute more. Garnish with sliced green onion (optional). Makes 6 main-dish servings.

Nutrition facts per serving: 392 calories, 17 grams total fat (6 grams saturated fat), 61 mg cholesterol, 1,117 mg sodium, 42 grams carbohydrate, 1 gram fiber and 23 grams protein. Daily Value: 15 percent vitamin A, 18 percent vitamin C, 21 percent calcium, and 24 percent iron. (*Reprinted from Successful Farming, Des Moines, Iowa, April 1995.*)

Reuben Soup from The Firehouse Brew Pub in Rapid City, South Dakota

1 pound cooked corned beef brisket, trimmed of fat
1/2 cup sauerkraut
1 stick butter
1/2 cup flour
3 cups cream
2 cups milk
1 cup diced white onion
1-1/2 cups grated Swiss cheese

1/2 teaspoon white pepper
3/4 teaspoon garlic salt
3/4 teaspoon onion powder
3/4 teaspoon celery salt
3/4 teaspoon lemon pepper
1/2 teaspoon salt

Dice or shred corned beef. Combine corned beef with sauerkraut and set aside. Melt butter in large soup pot over low heat. Add flour and heat 3 to 5 minutes, stirring constantly to cook flour and make a roux. Stir in cream and milk. Add onions. Increase heat to medium and continue cooking 7 to 10 minutes, stirring constantly, until soup thickens. Add cheese and stir to blend. Add white pepper, garlic salt, onion powder, celery salt, lemon pepper and salt. Add corned beef and sauerkraut. Stir until well-combined. Makes approximately 2 quarts, serving 4 to 6 people. (*Reprinted from The Champaign-Urbana News-Gazette [date not available]*).

Silver Spoon Cafe's Tomato Dill Soup

4 tablespoons margarine
2 cups peeled diced carrots
2 cups diced celery
2 cups diced onions
2 teaspoons minced fresh garlic
1/4 cup all-purpose flour
28 ounces canned whole Italian or plum tomatoes, drained with 1-1/2 cups juice reserved
1-1/2 cups tomato juice
1/4 cup canned tomato puree
3 cups chicken broth
2 tablespoons chicken base
1 packed tablespoon finely chopped fresh dill
3/4 teaspoon dried basil
3/4 teaspoon dried thyme
3/4 teaspoon dried tarragon
1 tablespoon sugar
1-2/3 cups cream

Melt margarine in large skillet over medium heat. Add carrots, celery, onions, and garlic and sauté until tender. Pour mixture into food processor and puree. Do not drain. Pour vegetable mixture into large soup pot and place over low heat. Add flour and stir continuously, approximately 5 minutes, to make roux. Remove from heat and set aside.

Pour canned whole tomatoes with juice into large bowl. Mash whole tomatoes into 1/2 inch or smaller chunks. Remove all tomato chunks and reserve remaining 1 1/2 cups tomato juice. Set aside.

In large sauce pan over medium-low heat combine 1-1/2 cups reserved tomato juice, additional 1/2 cups tomato juice and tomato puree. Add chicken broth and chicken base and stir to combine. Stirring constantly to blend, slowly add warm liquid to roux in soup pot.

Increase heat and bring to boiling point. Reduce heat to low and simmer 10 minutes. Add tomato chunks and simmer 5 additional minutes. Add dill, basil, thyme, tarragon, sugar, and cream. Stir to blend well and warm cream. Remove from heat and serve. Makes approximately 3 quarts. (*Reprinted from The Champaign-Urbana News Gazette [date not available]*).

American Botanist Updates Classic

Field and Garden Vegetables of America, by Fearing Burr, Jr., rescued and reprinted in 1988 by Keith Crotz of American Botanist, Booksellers, has recently become available in a new, improved printing. This version has been reproduced in a larger format with gilt decoration on the cover and spine.

Acid-free paper in a sewn binding makes this a high-quality reference tool for those interested in the history and restoration of our vegetable heritage. Kent Whealy of Seed Savers Exchange, Decorah, Iowa, has written a new preface to the 1994 edition, and Robert F. Becker of Cornell University has penned the introduction.

This book, originally published in the 1860s, was the first to provide complete and accurate descriptions of vegetable cultivars grown in America. Over 1,000 cultivars are included, some of which are still prized today. It is fascinating to page through Burr's venerable text and discover how many vegetables considered "exotic" now were apparently widely grown 130 years ago.

The real relevance of *Field and Garden Vegetables of America* for today's growers is that many of the varieties described within are today extinct. Many others are on the verge of being lost, and it is for those that this classic volume is an invaluable tool, both for variety verification and maintenance, and for genetic preservation. Many cultivars are kept today as unnamed heirlooms, or as varieties named for the family who has kept them. This book can be used to key out some of these precious varieties and restore their historical names.

Whether or not the reader has an interest in genetic preservation, this text makes great reading and provides a clear glimpse of vegetables and their culture as practiced when Lincoln was in the White House. To obtain a copy, send \$35, plus \$2 shipping and handling, to American Botanist, Booksellers, 1103 West Truitt Avenue, Chillicothe, Illinois 61523, or ask your favorite neighborhood bookstore to order a copy for you from the above address.

New Gardening Book Available

Vegetable Gardening in the Midwest, by Charles E. Voigt and J. S. Vandemark, has finally rolled off the presses. This revision of the 1978 publication, *Vegetable Gardening for Illinois*, provides information about basic vegetable gardening that can be used by novice home gardeners and small market growers alike. The authors have expanded the scope of the publication to cover the whole central area of the country, updated variety information, added recent technical innovations, and greatly expanded the sections on minor vegetables and herbs.

Chapter topics include planning the garden, preparing the garden, planting the garden, caring for the garden, and starting plants at home. A section on major vegetables gives information on the planting, care, and harvest of each vegetable; there is also a question and answer section and a list of common problems that may be expected. Generous sections on minor vegetables and herbs round out the body of the text, with storage information and selected references offered in the appendix.

The paperback version is selling at an introductory rate of \$10, postpaid, from now through October, and may be obtained by sending a check, made out to the University of Illinois, to

University of Illinois
Office of Agricultural Communications
and Education
Information Services
67-C5 Mumford Hall
1301 West Gregory Drive
Urbana, Illinois 61801
Phone: (217)333-2007

The order form is on the reverse side of this page.

Most local Extension offices will also carry this publication, and your local bookstore may be able to order it for you from the above address. A special hardcover edition will also be printed, mainly for libraries and devoted vegetable gardeners. Hardbound copies should be available in fall 1995. Cost of the clothbound version is yet to be determined.

_____ Yes! Please send _____ copy (copies) of *Vegetable Gardening in the Midwest*. I am enclosing a check or money order payable to the University of Illinois in the amount of \$10 each for the number requested.

Name _____

Address _____

City _____ State _____ Zip _____

Phone () _____

Charles E. Voigt

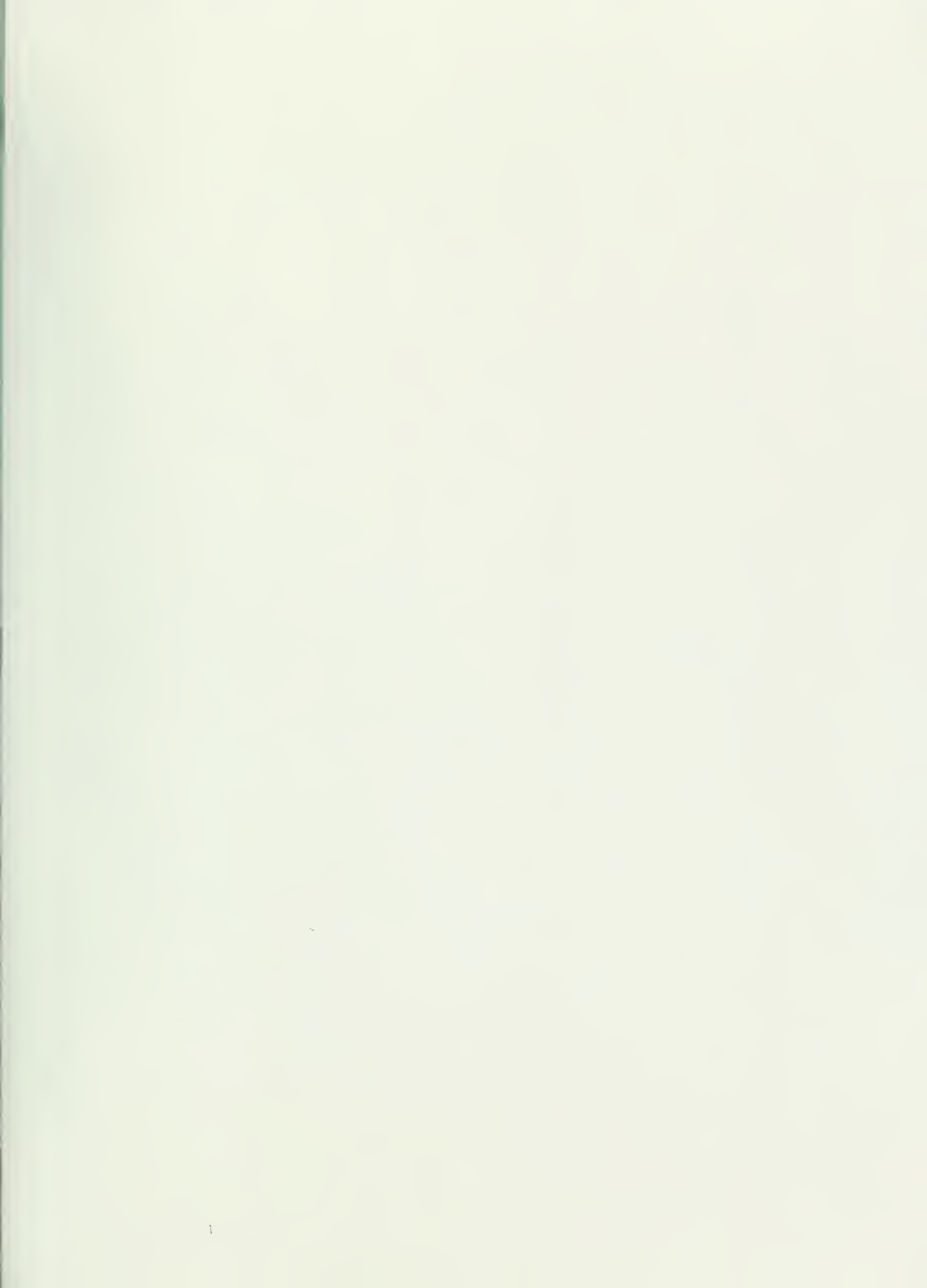
Charles E. Voigt
Extension Specialist
Vegetable Crops

_____ Please send a copy of the 1995 *Resources*
Catalog.

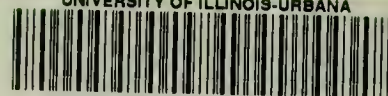
Cooperative Extension Service
 United States Department of Agriculture
 at Urbana-Champaign
 1301 West Gregory Drive
 Urbana, Illinois 61801

FIRST CLASS

66, LITHOGRAPH (SERIAL) 1-496
 218 W. GREGORY AVE.
 1301 WEST GREGORY DRIVE
 URBANA, ILL.



UNIVERSITY OF ILLINOIS-URBANA



3 0112 046919210